A QUESTIONNAIRE-BASED ANALYSIS OF ORDER-OF-BATTLE ELEMENTS

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Westinghouse Electric Corporation

Prepared for:

Army Research Institute for the
Behavioral and Social Sciences

January 1976

Technical Paper 271

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BATTLEFIELD INFORMATION SYSTEMS TECHNICAL AREA

U. S. Army

Research Institute for the Behavioral and Social Sciences

January 1976

U. S. ARMY RESEARCH INSTITUTE
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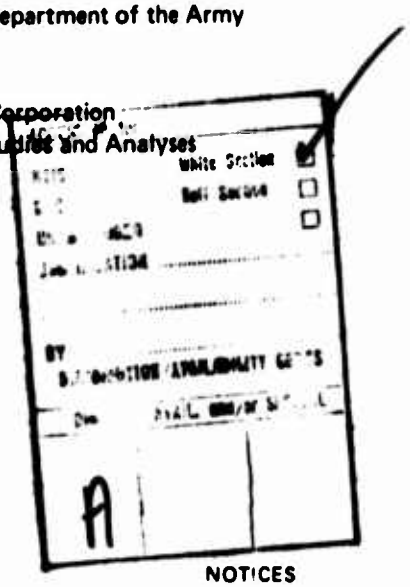

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: Technical Paper 271	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): A QUESTIONNAIRE-BASED ANALYSIS OF ORDER-OF-BATTLE ELEMENTS		5. TYPE OF REPORT & PERIOD COVERED: Final 5/72 - 9/72
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Edward N. Coates and Andrew W. McCourt		8. CONTRACT OR GRANT NUMBER(s): DAHC 19-72-C-0029
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Center for Advanced Studies and Analyses, Westinghouse Electric Corporation, 6521 Arlington Blvd., Falls Church, Virginia 22042		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 6.27.03A 20062703A754
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. Army Intelligence Center and School, Ft. Huachuca, Arizona		12. REPORT DATE: January 1976
		13. NUMBER OF PAGES: 70
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): U.S. Army Research Institute for the Behavioral and Social Sciences, Arlington, Virginia 22209		15. SECURITY CLASS. (of this report): Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Order-of-Battle
Tactical Intelligence
Intellig nce Collection
Intelligence Production
Intelligence Dissemination
Intelligence Requirements

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

On a questionnaire administered primarily to field grade officers, 1258 respondents rated the value to them of the eight elements of tactical Order of Battle (OB) intelligence and of the 95 components of these elements. Respondents evaluated how essential each element or component would be to their job in each of four scenarios describing different levels of war, and also rank ordered the elements and the components within each element.

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20. Respondents agreed generally on the relative values of OB elements; ratings of usefulness followed consistent patterns which were confirmed by the forced rankings. Intelligence on enemy Disposition was consistently rated the most valuable in all four conditions of war; enemy Strength, Composition, Combat Effectiveness, and Tactics were also considered crucial. The perceived value of Logistics intelligence increased with increasing intensities of war, while that of Tactics and Training was greatest in low-intensity conditions. Military Intelligence branch officers valued every element except Training more highly than Combat Arms officers did while Combat Arms officers consistently valued every element more than support branch officers did. The results provide the basis for further examination of intelligence requirements and priorities in intelligence collection, production, and dissemination under various conditions of war.

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1300 Wilson Boulevard, Arlington, Virginia 22209

January 1976

Army Project Number
20062703A754

Intelligence Systems

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FOREWORD

The Battlefield Information Systems Technical Area of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) is concerned, in part, with human information analysis, interpretation functions, and the subsequent utilization of the products in intelligence systems. The objective is to provide technological advances in human/machine-aided tactical intelligence information processing and the translation of these advances in support of intelligence systems requirement and design decisions, and formulation of doctrine and procedures.

One facet of military intelligence addressed within this program is tactical Order of Battle (OB). This report analyzes the importance of the different elements and components of OB intelligence, providing the considered judgments of 1258 users on the value to them of each item under each of four conditions of war. This effort utilized data collected in a separate contractual study sponsored by the Army Assistant Chief of Staff for Intelligence (ACSI) and entitled "Analysis of Collection System Tasking and Product Integration (U)." ARI conducted the analyses discussed in this report as an economical means of obtaining insights into the perceived importance of the various components of Order of Battle. Together with a second ARI report, Technical Paper 265 on "Tactical Crder of Battle: A State-of-the-Art Survey," it provides the comprehensive picture of the structure and meaning of OB and its unique role in tactical intelligence, a picture requisite to future efforts to improve OB analysis and tactical intelligence information processing in general.

This effort is responsive to requirements of RDTE Project 20062703A754, Intelligence Information Processing, FY 1973 Work Program, and to special requirements of the U.S. Army Intelligence Center and School. ARI research in this area is conducted as an in-house effort augmented by contracts with organizations selected as having special capabilities for specific research tasks. The present study was conducted under guidance of the Army Research Institute by Westinghouse Electric Corporation Center for Advanced Studies and Analyses, Falls Church, Virginia.

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A QUESTIONNAIRE-BASED ANALYSIS OF ORDER-OF-BATTLE ELEMENTS

BRIEF

Requirement:

To determine the perceived value to the user of the elements of Order of Battle (OB) intelligence--Composition, Disposition, Strength, Training, Tactics, Logistics, Combat Effectiveness, and Miscellaneous--and of the components of these elements.

Procedure:

A questionnaire asked officers to rate the usefulness of each of the eight elements and 95 components of OB intelligence on a 5-point scale ("essential" to "of little use") under each of four possible conditions of war (pre-hostility and low, medium, and high intensity) as defined by specific examples. Respondents also ranked the eight elements in the order of their importance under each of the four conditions, and similarly ranked components within each element. Usable responses were obtained from 1252 commissioned and 6 noncommissioned officers. Most respondents were attending the Army Command and General Staff College, Army War College, or National War College; some respondents were selected from corps and division Intelligence (G2) and Operations and Training (G3) staff in USAREUR/Seventh Army. All responses were computer analyzed. Comparisons were also made between specific subgroups of respondents.

Findings:

Respondents, across all four scenarios, generally agreed on the relative value of OB elements. Enemy Disposition, Strength, Composition, Combat Effectiveness, and Tactics were considered the most important elements, Miscellaneous the least. Disposition, Composition, and Combat Effectiveness intelligence about Armor, Artillery, and Infantry units was considered more valuable than similar intelligence on other kinds of unit. The most essential components of Strength were intelligence on enemy artillery weapons and ammunition, except during high-intensity conflict when enemy CBR weapons and munitions strength became the most important.

Military Intelligence officers consistently rated every OB element except Training as more valuable than Combat Arms officers did. In turn, Combat Arms officers consistently rated every OB element as more valuable than combat support officers did.

Utilization of Findings:

The relative importance of the OB elements can be used as a basis for structuring computerized OB files, allocating work loads, and determining general OB collection requirements. The information has potential use in research on commander's information needs and on the value of intelligence.

A QUESTIONNAIRE-BASED ANALYSIS OF ORDER-OF-BATTLE ELEMENTS

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A QUESTIONNAIRE-BASED ANALYSIS OF ORDER-OF-BATTLE ELEMENTS

PURPOSE

The primary objective of this study was to determine, in the most acceptable, timely, and inexpensive manner, the perceived value to the user of items of Order of Battle (OB) intelligence. Until now no study has defined the values of the components of Order of Battle, although individuals have offered informal opinions. This study was also expected to provide insights for future research to improve tactical intelligence information processing. Because knowledge of OB values applies directly to intelligence collection activities and resources, intelligence production and dissemination, and similar intelligence and operational activities, this study would be a significant contribution.

A secondary objective in this study was to explore possible differences in responses related to a respondent's career-specialty branch, his rank, or his duty location. Also, alternative methods of defining the overall values of all 95 components were considered.

The effort utilized data collected in a separate contractual study sponsored by the Army Assistant Chief of Staff for Intelligence (ACSI) and entitled "Analysis of Collection System Tasking and Product Integration (U)." Subsequently, ARI completed preparation of the data base and conducted the analyses discussed in this report as an economical means of obtaining insights into the perceived importance of the components of OB.

PROCEDURE

ACSI had stipulated that the study should consider only Order of Battle intelligence for ground forces in a European/Middle-Eastern environment that would involve USAREUR/Seventh Army. The conditions of warfare were stipulated as a pre-hostilities situation and low-, mid-, and high-intensity war.

Because the data were collected to determine the value of OB intelligence to the user, the approach included a formally structured collection of opinions from a broad spectrum of officers who use OB. Of primary interest were the values assigned by the respondents to the eight major elements and the 95 components comprising OB intelligence. The analyses were broken down by each of the four intensity levels of war considered by the respondents.

The definitions of what constitutes OB were based on relevant Army manuals such as FM 30-5[1] and on the Defense Intelligence Agency's

[1] Department of the Army. Field Manual 30-5, "Combat Intelligence," 30 October 1973.

intelligence Subject Code (ISC); the stipulated conditions of war reflected the conditions described in Army-approved scenarios. A questionnaire was developed that described four conditions of war that USAREUR/Seventh Army forces might face and then asked the respondent to state his opinion on the value of the relevant OB elements and ISC intelligence components for each condition of war. The respondent did this in two ways: (1) he indicated how essential he felt each OB item would be to the performance of his job if he were assigned to USAREUR/ Seventh Army, on a five-point rating scale, and (2) he rank ordered the items in each category according to their importance to him. Thus, the respondent could indicate that two or more items in a given set were "essential," but he was also forced to indicate their relative importance. Requesting two different values for each intelligence item caused the respondent to consider his answers more seriously and provided both a check on the ratings and more informative results. Appendix A presents a detailed description and an abridged example of the questionnaire.

After the questionnaire had been developed and tested, it was given to Intelligence and Operations (G2 and G3) personnel in Germany and to officer students at the U.S. Army Command and General Staff College, U.S. Army War College, and the National War College. After the completed questionnaires were returned, answers keypunched for computer analysis, and errors corrected, usable data from 1258 out of approximately 1300 respondents were available for analysis. Of these respondents, 6 were noncommissioned officers (NCO) and 1252 were commissioned officers.

The Rating and Ranking Process and the Conditions of War

The rating and ranking process. The questionnaire asked that the respondent assign a rating of essentiality to each intelligence item in a given category, using the following ratings:

1 = Essential

2 = Important

3 = Useful

4 = Of some use

5 = Of little use

Several or even all items in a given category could be judged "essential" by a respondent. Figure 1 is an example in which a hypothetical respondent has first assigned values to the eight major elements of OB. The example shows that the respondent considers Composition, Disposition and Tactics intelligence "essential" to his job; Strength intelligence is "important;" Logistics and enemy Combat Effectiveness intelligence are "useful" and so on.

	Essentiality Rating	Forced Ranking (1 thru 8)
COMPOSITION	1	2
DISPOSITION	1	1
STRENGTH	2	4
TRAINING	4	7
TACTICS	1	3
LOGISTICS	3	6
COMBAT EFFECTIVENESS	3	5
MISCELLANEOUS	5	8

Figure 1. Example of essentiality rating and forced ranking of OB elements at one intensity level.

The respondent next ranked the value of all items in the group. In this example, the following, all "essential" to the respondent, are listed in their order of relative value: Disposition, Composition, Tactics.

This system of providing essentiality ratings and forced order rankings was used for the major elements of OB, and for the various components of each element, for each of the four conditions of war.

The conditions of war. Condition I presented to the respondents a pre-hostility situation defined as a continuing period of nonconflict between US/NATO and USSR/Warsaw Pact forces, punctuated with crises or periods of tension similar to the 1961 Berlin and 1968 Czechoslovakian problems.

Condition II was described as a low-intensity conflict in which the U.S. is assisting a friendly nation in the Middle East to counteract a revolt that occurred among certain tribal groups. The U.S. has sent a task force from USAREUR/Seventh Army to safeguard the U.S. military aid supplies and forces, to provide intelligence support, and to conduct limited stability operations.

Mid-intensity conflict (Condition III) was defined as non-nuclear war between NATO and the Soviet Bloc following a Soviet attack to seize Western Europe.

High-intensity conflict (Condition IV) was defined as tactical nuclear war between NATO and the Soviet Bloc.

Characteristics of Respondents

The questionnaire was designed so that the respondents' source or origin, rank, career specialty branch, and current or last duty assignment could be identified and used in the analysis of responses. Data on source, rank, and career branch of respondents are summarized in Table 1.

Source. Questionnaires were distributed in Germany in June 1971 and were sent to the three colleges in the fall of 1971. Usable questionnaires were returned from 56 respondents in the G2 and G3 staffs of four divisions, two corps, and USAREUR/Seventh Army headquarters in Germany. The Army Command and General Staff College provided 1022 usable questionnaires, the Army War College 145, and the National War College 35.

Rank. Table 1 shows the distribution of the 1258 respondents by rank or grade. Four of the respondents did not identify their rank (or give their name, branch, or other identifying information). The noncommissioned personnel were senior and knowledgeable people from the G2 staffs in Germany. The sample contains relatively few junior officers (lieutenants and captains) or colonels, though there are enough to analyze their responses as a group.

Branch. Table 1 shows the distribution by career specialty branch of the 1258 respondents. Note that all career branches are not represented, because responses were requested only from those branch officers who use or generate OB intelligence in the normal course of duty. Such a selection process includes the Combat Arms and some Combat Support branches, but excludes some of the Combat Service Support branches such as Finance or Chaplain.

FINDINGS

Value of OB Elements

This section focuses on the essentiality ratings and forced rankings of the eight elements of OB as perceived by all 1258 respondents. These eight elements, the major categories of OB intelligence, are defined in FM 30-5 as summarized below:

Composition: The number of enemy units by type from the highest level down to separate companies and detachments.

Disposition: Unit designation and field post numbers, mission, subordination, and location.

Table 1

CHARACTERISTICS OF RESPONDENTS

(N = 1258)

Source	n	Rank	n	Branch	n
Corps and Divisions in Germany	56	Unidentified	4	Unidentified	11
				Armor	114
Command and General Staff College	1022	NCO	6	Field Artillery	209
				Air Defense Artillery	93
Army War College	145	Lieutenant (2nd and 1st)	10	Infantry	346
				Engineer	90
National War College	35	Captain	24	Signal	89
				Military Police	35
		Major	850	Military Intelligence	98
				Chemical	20
		Lieutenant Colonel	325	Transportation	66
				Ordnance	8
		Colonel	39	Quartermaster	57
				Medical Service	21
				Adjutant General	1

Strength:	Number of men, weapons, and equipment.
Training:	Nature, type, and extent of training of individuals and units, and the organization facilities, etc., which accomplish this.
Tactics:	Doctrinal precepts guiding the ground forces in the conduct of warfare.
Logistics:	Methods, plans, and systems for procurement, storage, shipment, issue, and maintenance of materials and supplies and for movement of troops.
Combat Effectiveness:	The ability and fighting quality of units; how well they will perform in combat.
Miscellaneous:	Files on enemy personalities, unit histories, uniforms and insignia, and capability of enemy weapons and equipment.

Essentiality Ratings

Figure 2 presents the mean values of the more than 1240 essentiality ratings[2] of the eight major elements of OB, for the four intensity levels of war. The exact values of the means shown on Figure 2 are contained, along with other statistical measures such as standard deviation, skew, and kurtosis, in computer printouts bound separately and available at ARI. Figure 2 shows that the respondents felt that all OB intelligence is somewhat useful. Even the lowest rated category, Miscellaneous, was seen as "of some use." An examination of actual information use would probably reveal that much of what is stated to have real value will in practice be rarely used or will contribute very little. However, although the absolute rating of the potential value of any information may not precisely indicate its actual usefulness, the relations among the ratings should clearly indicate the relative values of the elements. Thus, in the following discussion the emphasis is on the relations among the ratings of usefulness. The labels on the five-point scale do provide a context for interpreting the results; an OB element rated as "essential" or "important" by over 1240 officers can safely be assumed to have considerable value to those officers.

Figure 2 indicates the respondents felt that Disposition intelligence was the most valuable to them in all four conflict levels and Miscellaneous

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[2] All respondents did not answer all questions. Thus, 1246 respondents made ratings in the pre-hostility situation, 1248 in the low-intensity conflict, and so on.

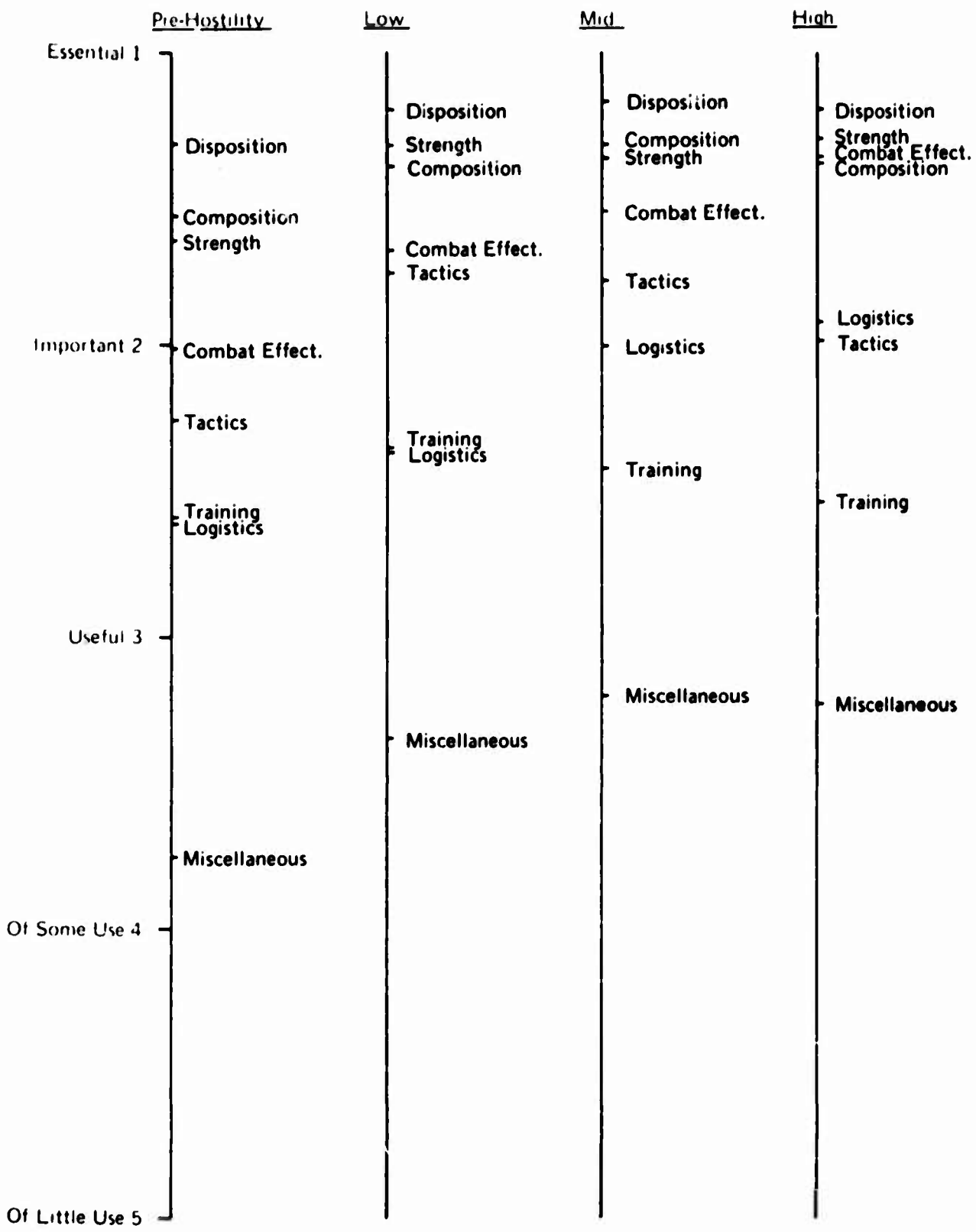


Figure 2. Essentiality ratings of 8 OB elements--all respondents.

intelligence the least valuable. Intelligence on enemy Composition and Strength follow Disposition and have similar essentiality. Combat Effectiveness and Logistics intelligence increase in essentiality as the intensity of war increases. The value of Tactics and of Training intelligence increases from pre-hostility conditions to conditions of low-intensity war, but as the intensity of war increases, both values tend to decrease.

Statistical Significance of Essentiality Ratings

The statistical significance of the results shown in Figure 2 were tested using a one-tailed test based on the Student's t distribution. Results are presented in Tables 2 through 4 in terms of the probability that the values are not different from one another in the indicated direction (i.e., that they are the same or that there is a reversal of values). Given the large number of such tests conducted, only those differences with a probability value of .01 or less are considered statistically significant.

As shown in Table 2, for the pre-hostility situation (Condition I) all OB elements received significantly higher ratings than the next ranked element, with the exception of Training which is not statistically different from Logistics. A similar pattern occurs in the low-intensity war situation (Condition II); in mid-intensity war (Condition III) all differences between adjacent ratings are significant (Table 3). In high-intensity war (Condition IV) Combat Effectiveness and Composition have essentially the same rated value and Tactics and Logistics have essentially the same rated value; all other differences are significant. Thus, we may conclude that, with a few exceptions, the differences in ratings seen in Figure 2 within a given intensity level are quite real and not the result of random fluctuations in the data. Similarly, the ratings given to an element were compared across levels (I to II, I to III, and III to IV) and, with two exceptions, the differences were found to be significant (Table 4). Disposition and Miscellaneous intelligence received the same ratings in the high-intensity and in the mid-intensity war situation.

Forced Rankings

Respondents were asked to rank the elements of OB in order of importance as well as to rate their essentiality. The average rank order of the elements in each condition of war, as determined from the responses of approximately 1250 respondents, is shown in Figure 3. The exact values of these arithmetic means, along with related statistical measures, are available in computer printouts at ARI and are shown graphically in Appendix B.

Rank-order judgments were requested from the respondents in order to force them to consider their responses more carefully and to provide a cross-check on the essentiality ratings and a supplementary indicator of perceived value.

Table 2

STATISTICAL SIGNIFICANCE OF ESSENTIALITY RATINGS
WITHIN CONDITIONS I AND II OF WARFARE

Condition I--PRE-HOSTILITY			Condition II--LOW INTENSITY		
Element	Mean Rating	Probability of No Difference between Adjacent Ratings	Element	Mean Rating	Probability of No Difference between Adjacent Ratings
Disposition	1.317		Disposition	1.198	
		.001			.001
Composition	1.565		Strength	1.321	
		.006			.008
Strength	1.648		Composition	1.384	
		.001			.001
Combat Effect.	2.018		Combat Effect.	1.679	
		.001			.006
Tactics	2.260		Tactics	1.260	
		.001			.001
Training	2.593		Training	2.365	
		.280			.489
Logistics	2.615		Logistics	2.366	
		.001			.001
Miscellaneous	3.760		Miscellaneous	3.353	

Table 3

STATISTICAL SIGNIFICANCE OF ESSENTIALITY RATINGS
WITHIN CONDITIONS III AND IV OF WARFARE

Condition III--MID INTENSITY			Condition IV--HIGH INTENSITY		
Element	Mean Rating	Probability of No Difference between Adjacent Ratings	Element	Mean Rating	Probability of No Difference between Adjacent Ratings
Disposition	1.170		Disposition	1.194	
		.001			.001
Composition	1.313		Strength	1.295	
		.018			.003
Strength	1.368		Combat Effect.	1.367	
		.001			.397
Combat Effect.	1.545		Composition	1.374	
		.001			.001
Tactics	1.776		Logistics	1.923	
		.001			.044
Logistics	2.005		Tactics	1.986	
		.001			.001
Training	2.424		Training	2.535	
		.001			.001
Miscellaneous	3.201		Miscellaneous	3.238	

Table 4

STATISTICAL SIGNIFICANCE OF ESSENTIALITY RATINGS
BETWEEN CONDITIONS OF WARFARE

Elements Compared	Probability of No Difference in Elements at Different Conditions		
	Conditions I to II	Conditions I to III	Conditions III to IV
Composition to Composition	.001	.001	.010
Disposition to Disposition	.001	.001	.122
Strength to Strength	.001	.001	.002
Training to Training	.001	.001	.002
Tactics to Tactics	.001	.001	.001
Logistics to Logistics	.001	.001	.014
Combat Effect. to Combat Effect.	.001	.001	.001
Miscellaneous to Miscellaneous	.001	.001	.196

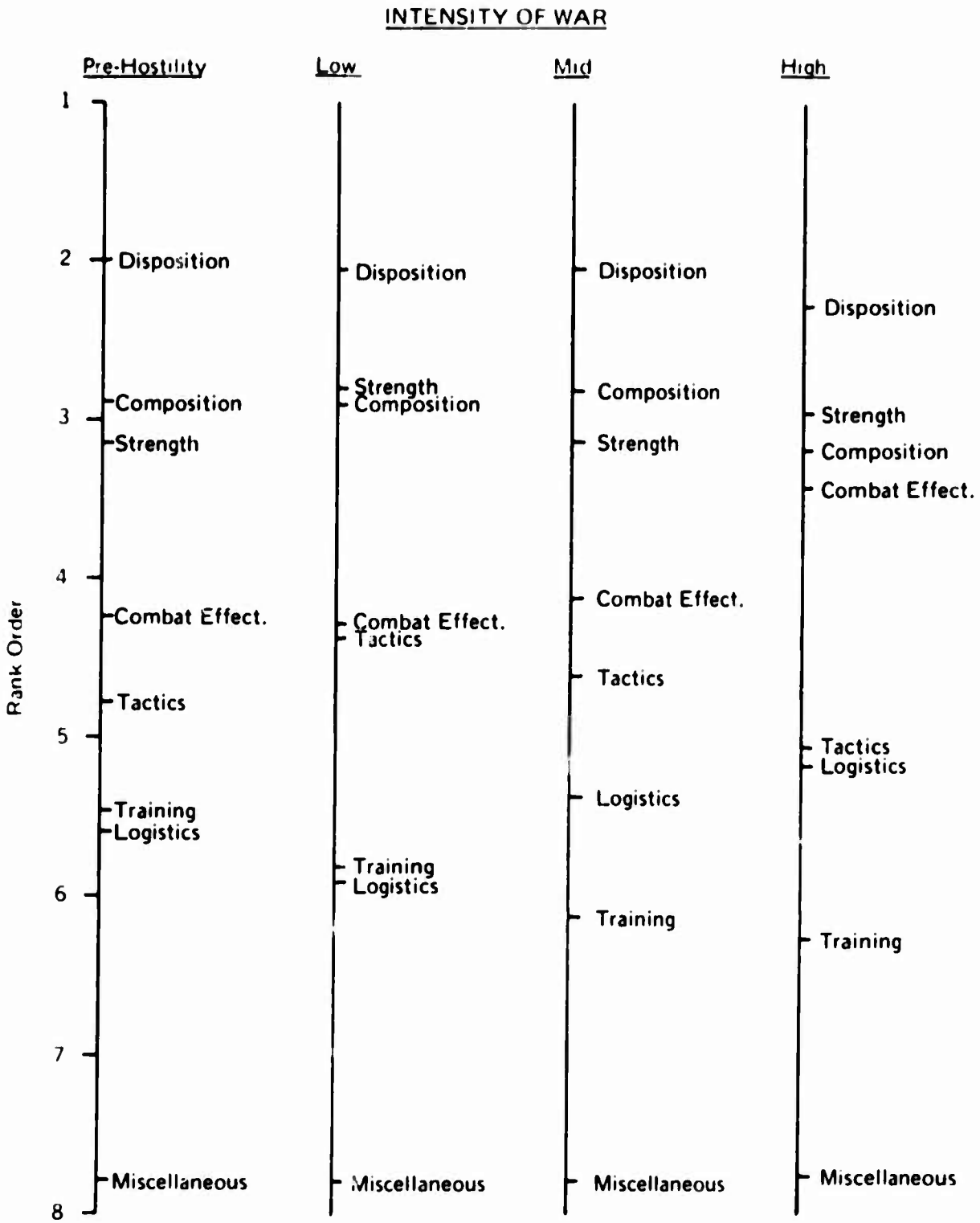


Figure 3. Forced rankings of 8 OB elements--all respondents.

A comparison of Figures 3 and 2 indicates that the order of the ranked elements parallels the order of the essentiality ratings, with only two exceptions. The rankings of Figure 3 confirm the ratings of Figure 2, indicating that our respondents were consistent in their evaluation of the elements of OB.

Value of OB Components

This section focuses on the essentiality ratings of the components of intelligence in each of the eight major elements of OB, as perceived by all 1258 respondents. The number of components in the different elements varies; for instance, the Composition element of OB contains eleven components, Disposition contains twenty-four components, Strength contains twenty-three.

The mean essentiality rating is presented for each component of each element of all four conditions of war considered. The exact values of the ratings and associated statistical measures are available in computer printouts at ARI, and the mean forced rankings of the components are in Appendix B in this report.

Composition. The analysis sought to determine which portions of an enemy's force the respondents considered most valuable at each of the four intensity levels of war investigated.

As shown in Figure 4, the respondents felt that knowledge of the Composition of an enemy armored unit was the most valuable in a pre-hostility situation, but similar intelligence on infantry units was most valuable in low-intensity war. In mid- and high-intensity war the Composition of artillery units was most essential. The Composition of armored, artillery, and infantry units was more valuable in every condition of war than Composition intelligence on any other units. (The term "armored" includes mechanized and cavalry units, and "artillery" includes conventional artillery, rocket and missile units.)

Intelligence on the Composition of the enemy's irregular forces (the guerrilla, partisan, and resistance units) was more valuable in the low-intensity war condition than in any other level of war. In the other three conditions, composition of irregular forces rated quite low compared with other components, but was still slightly above "useful" on the scale of essentiality.

Knowledge of the Composition of an enemy's special purpose units was rated surprisingly low compared to other units. Because special purpose units include amphibious, cold weather, and mountain forces (both border and internal units), it was expected to rate higher than other units. However, intelligence on the Composition of special purpose units is rated at least "useful" except in the pre-hostility situation.

Intelligence on the Composition of enemy combat support and combat service support units increases in essentiality rating with increasing intensity of war. However, the value of Composition intelligence on

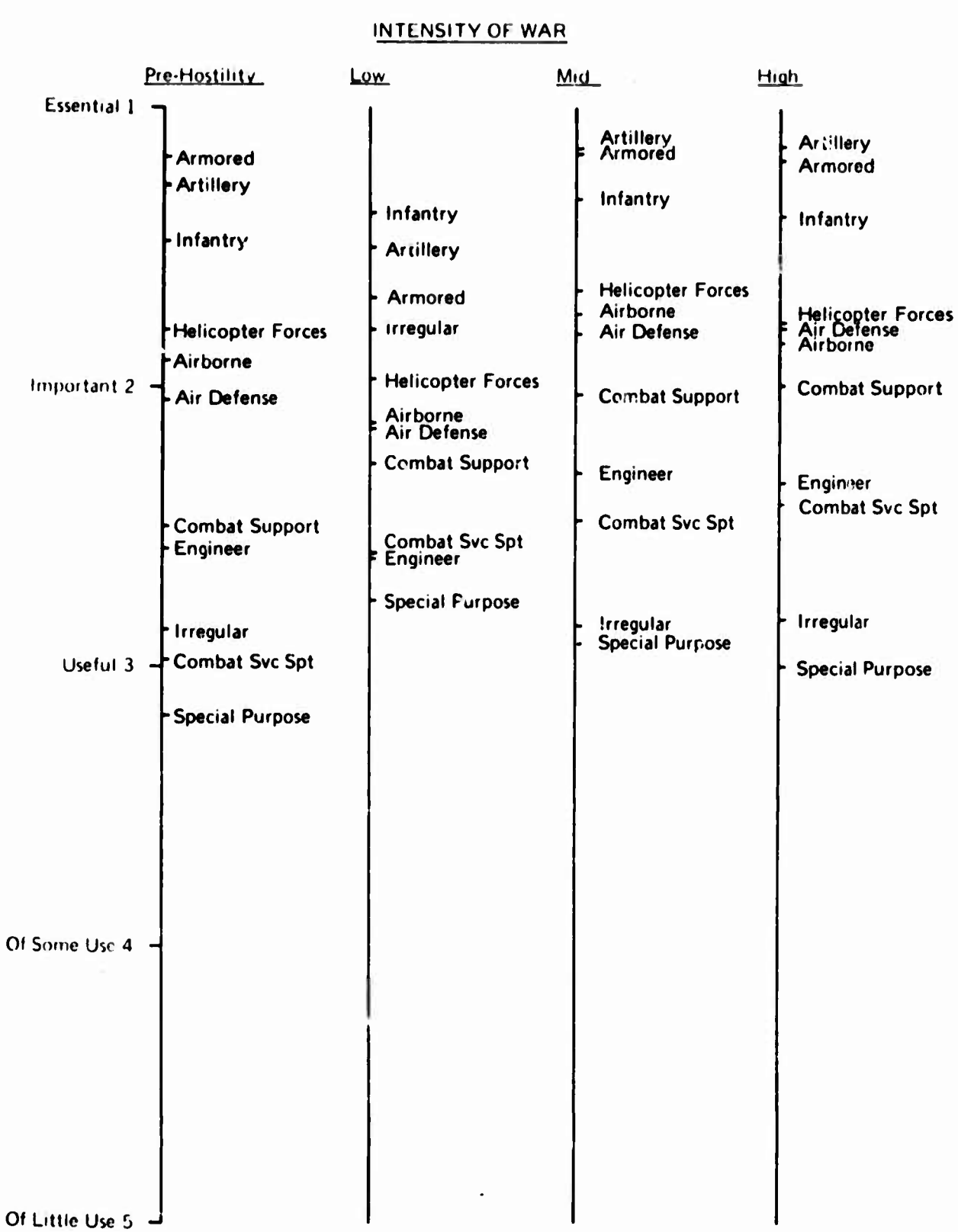


Figure 4. Essentiality ratings of 11 components of Composition intelligence--all respondents.

other units, such as airborne, helicopter forces, and engineer, increases from peacetime to mid-intensity war (disregarding low-intensity war) but then decreases in the change from mid- to high-intensity war.

Disposition. This element is concerned with unit designation and field post numbers, location, subordination, and mission. The analysis sought to determine whether the respondents considered it more essential to know the disposition of one unit or type of site than another, in each of the four intensity levels of war. Disposition intelligence has 24 components; no attempt will be made to discuss each component in detail.

The mean essentiality ratings of the components of Disposition are presented in Figure 5. As shown, intelligence on the Disposition of armored, artillery and infantry units is more valuable than intelligence concerning the Disposition of any other units or sites. However, in high-intensity war, the essentiality ratings for infantry units, fixed surface-to-surface missile (SSM) sites, and mobile SSM sites are almost identical.

A comparison of Figure 5 with Figure 4 indicates that components common to both elements tend to follow a similar rating pattern. Intelligence on the armored, infantry and artillery units was seen as essential; the essentiality ratings of combat support and combat service support units increase in value as the intensity of war increases.

Intelligence on the Disposition of enemy depots--including ammunition supply points (ASP) and special ammunition supply points (SASP)--is in the "useful" to "important" rating range in peacetime and in low- and mid-intensity war, but at the high-intensity war level its rating has increased to the range between "important" and "essential."

The Disposition of military installations (located but unidentified) is below the "useful" rating before hostilities begin though it is slightly above the bottom of the "important" to "useful" range in low-, mid-, and high-intensity war.

The value of Disposition of electronic warfare (EW) installations increases slightly in the transition (disregarding low-intensity) from peacetime to mid- or high-intensity war. Intelligence on the Disposition of radar installations follows a similar pattern, though the increase in value is somewhat greater.

As Figure 5 shows, very few items were rated less than "useful." The lowest rated component, the disposition of prisoner of war (POW) installations, was always rated in the range "of some use" to "useful." Intelligence on the amphibious, cold weather, and mountain (special purpose) units was again rated low, sometimes less than "useful" in value.

Strength. This element is concerned with the numbers of enemy personnel, weapons, and equipment. The mean ratings of essentiality of the components of Strength intelligence are shown in Figure 6. Although Strength intelligence has 23 components, only some of these will be discussed.

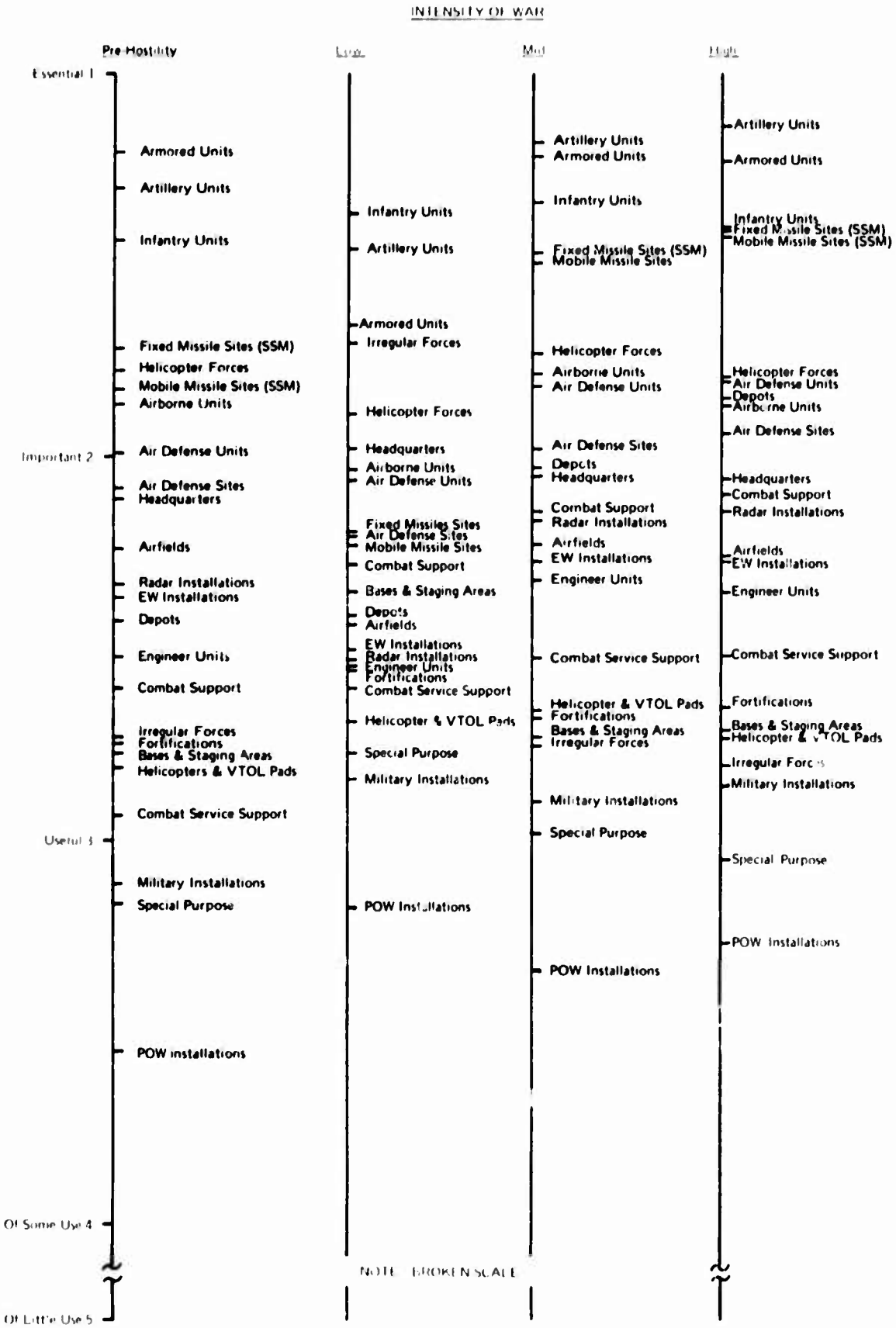


Figure 5. Essentiality ratings of 24 components of Disposition intelligence: all respondents.

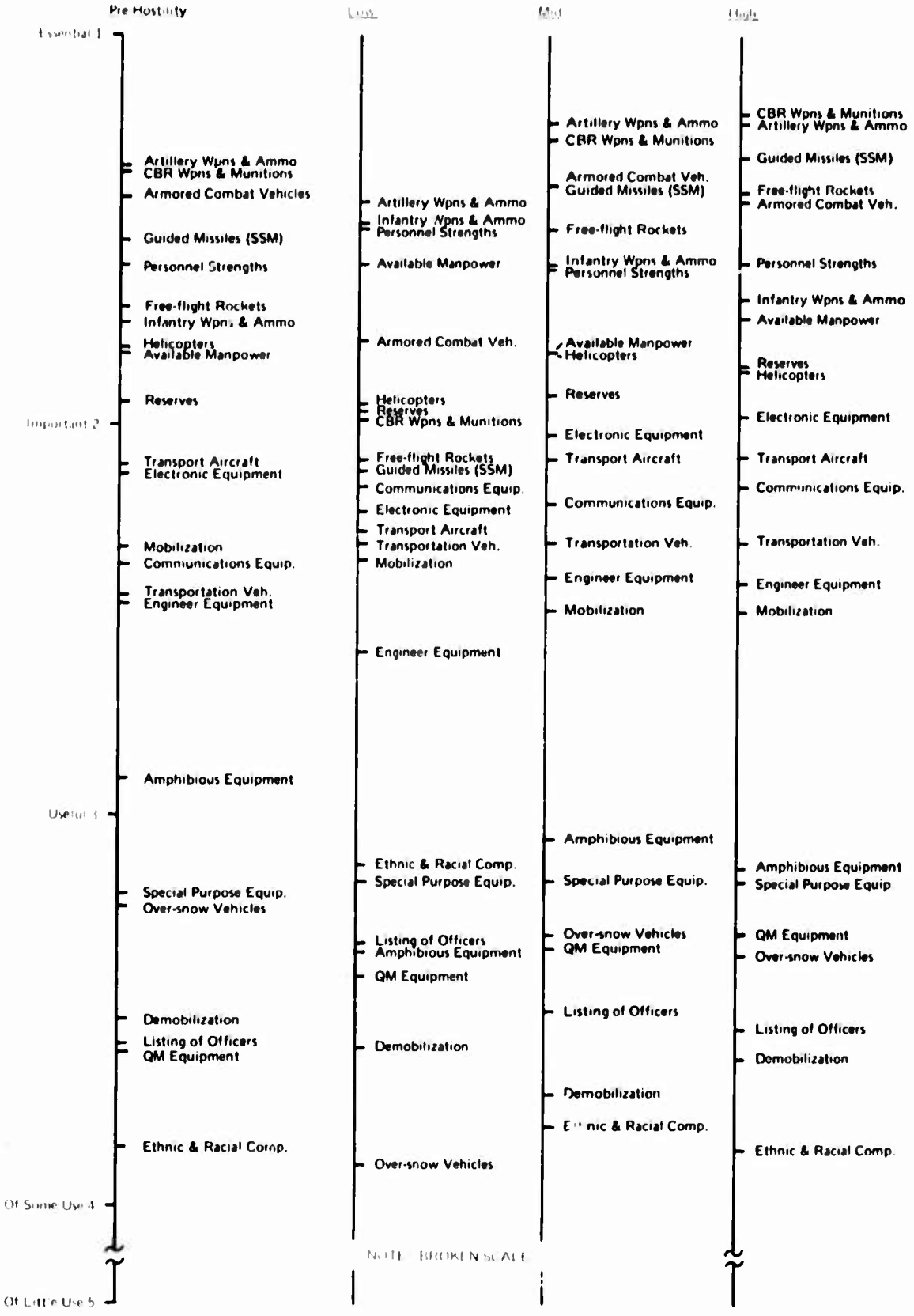


Figure 6. Essentiality ratings of 23 components of Strength Intelligence: all respondents.

As shown, the number of enemy artillery weapons and amount of artillery ammunition received the highest essentiality rating in the pre-hostility condition and in low- and mid-intensity war. In high-intensity war, intelligence on the enemy's Strength in chemical-biological-radiological (CBR) weapons and munitions was judged slightly more valuable than intelligence on artillery weapons and ammunition.

Intelligence on the numbers of enemy guided surface-to-surface missiles (SSM) and free-flight rockets is of lower value in low-intensity war than in mid- or high-intensity war.

Intelligence on the enemy's available manpower is at its highest value in low-intensity war, though such intelligence is rated between "important" and "essential" in every intensity level.

The essentiality of intelligence on the numbers of enemy transport aircraft remains fairly constant among the pre-hostility, mid- and high-intensity war conditions; that for ground transportation vehicles is constant across all levels except peacetime.

Knowledge of the Strength of enemy amphibious equipment tends to drop in value in a transition from peace to some condition of war, as does the value of knowing the number of enemy over-snow vehicles.

Knowledge of the Strength of racial and ethnic composition of enemy forces was rated of lowest value in all conditions of war except low intensity. In the low-intensity war scenario where any information on ethnic and racial composition was expected to be of fairly high value, the respondents felt that such intelligence was only between "useful" and "of some use" to them.

Training. Training intelligence is concerned with the nature, type, and extent of the training of individuals and units, and the organization and facilities used in such training. Figure 7 presents the essentiality ratings of the ten components of Training intelligence.

As shown, the respondents felt that intelligence on the training of combat units was the most valuable, followed by intelligence on the training of combat support units. Intelligence on the training of combat service support units was rated third in the pre-hostility situation and in mid- and high-intensity war. In low-intensity war, intelligence on the training of enemy irregular units was rated third, very close to that on combat support units.

Intelligence concerning enemy maneuvers is of highest value in the pre-hostilities situation, and declines in value as war starts. Knowledge of the enemy's training areas and its military school system follows a similar declining trend, though the value for training areas intelligence increases slightly in the low-intensity war situation.

Intelligence concerning pre-induction training is valued least in all conditions of war, though it is still rated above "of some use."

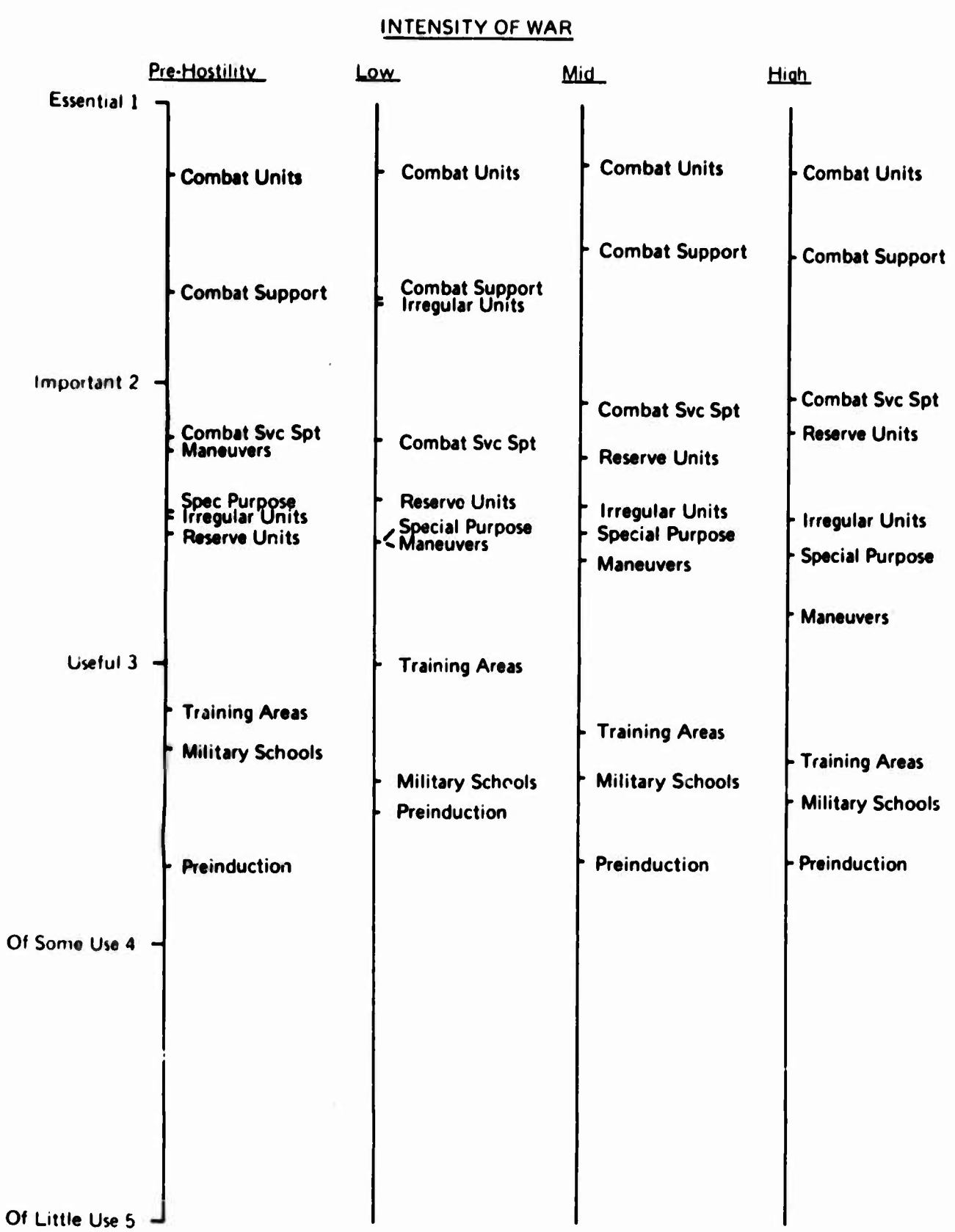


Figure 7. Essentiality ratings of 10 components of Training intelligence--all respondents.

Tactics. Tactics concerns intelligence on the doctrinal precepts that guide enemy forces in their conduct of war.

As shown in Figure 8, the respondents felt that intelligence on enemy nuclear operations tactics was of highest value before war and in mid- and high-intensity war. Intelligence on chemical and biological warfare tactics was rated second in high-intensity war, and third in mid-intensity war and peacetime.

In low-intensity war, knowledge of enemy conventional tactics was rated highest, followed by intelligence on tactics of paramilitary operations.

Intelligence on enemy air defense tactics stays at a fairly constant value in all four conditions, with a rating of "important."

Knowledge of the enemy s tactics in special operations (amphibious, cold weather, and mountain) was rated lowest in all conditions of war, though it was still judged to be more than "useful" to the respondents.

Logistics. Logistics includes intelligence on the enemy's methods, plans, and systems for procurement, storage, shipment, issue, and maintenance of materials and supplies; and for movement of troops.

The values that the respondents place on the six components of Logistics intelligence are presented in Figure 9. As shown, the respondents consistently rated intelligence on enemy troop and supply movements of highest value, followed by intelligence on the location, stockage levels, and capacity of enemy stockpiles. Note the large gap between the value ratings of these two components and the components that follow.

Knowledge of enemy doctrine for evacuation and dispersal of material and personnel increases in rating as the intensity of war increases.

Intelligence on the enemy's servicing techniques was consistently rated lowest by the respondents though at no time does it rate below "useful" in value.

Combat Effectiveness. Combat Effectiveness concerns the ability and fighting quality of units, including predicting how well these units will perform in combat. Combat Effectiveness intelligence is produced from other elements of OB including Strength and Training, and from combat intelligence data not otherwise included in Order of Battle. Because Combat Effectiveness is in part derived from other OB elements, and because it considers the same kinds of units as does Composition and Disposition, one might expect some consistency in the ratings among these elements. A comparison of Figure 10 with Figures 4 and 5 reveals the expected consistency in the order of component ratings. Thus, armored, infantry, and field artillery units were always the three highest, just as these units were always rated highest in Composition and Disposition intelligence. The order of ratings is not totally consistent, however, for mid- and high-intensity conditions. The forced rankings of the components of Combat Effectiveness, shown in Appendix B, confirm

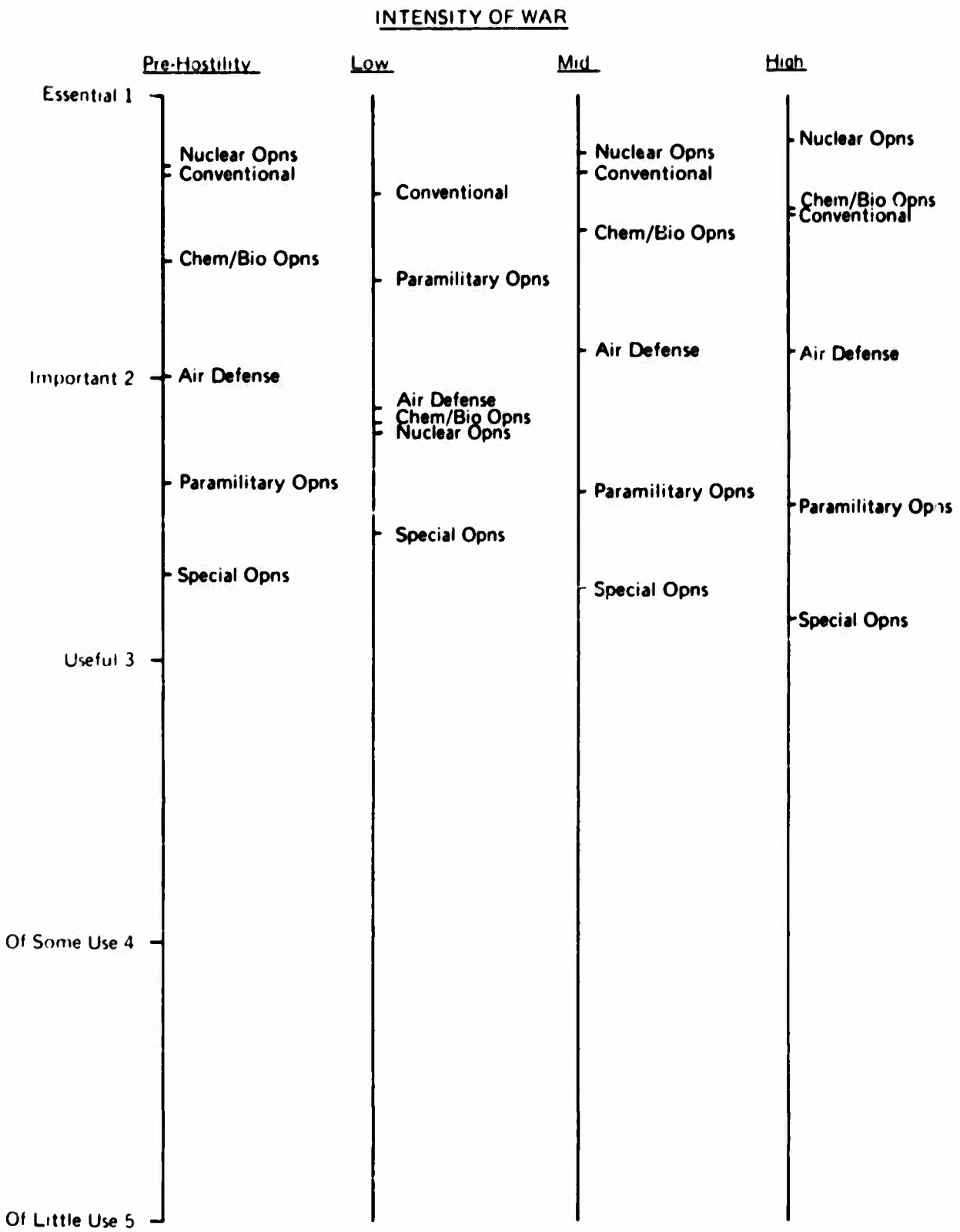


Figure 8. Essentiality ratings of 6 components of Tactics intelligence–all respondents.

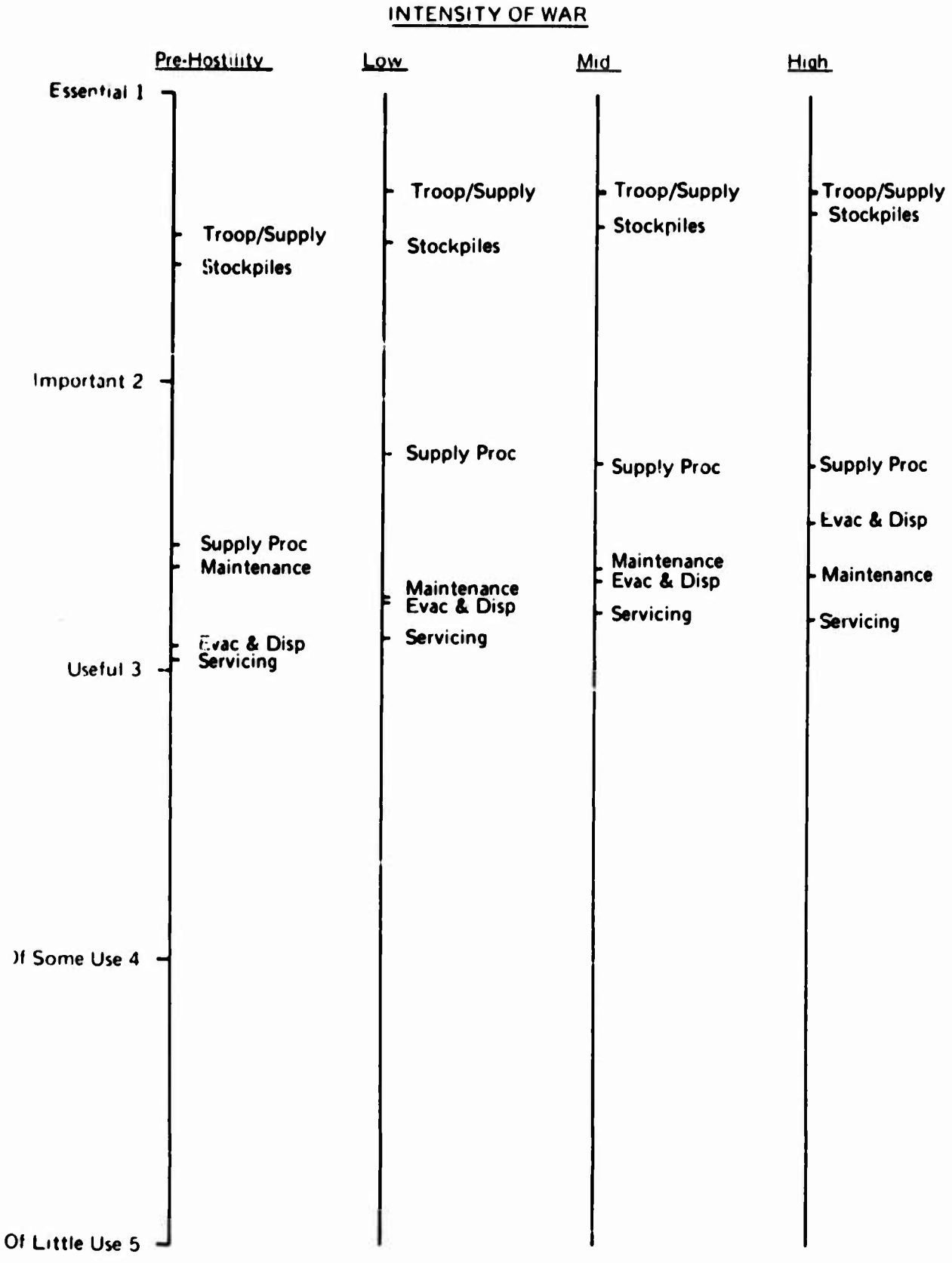


Figure 9. Essentiality ratings of 6 components of Logistics intelligence--all respondents.

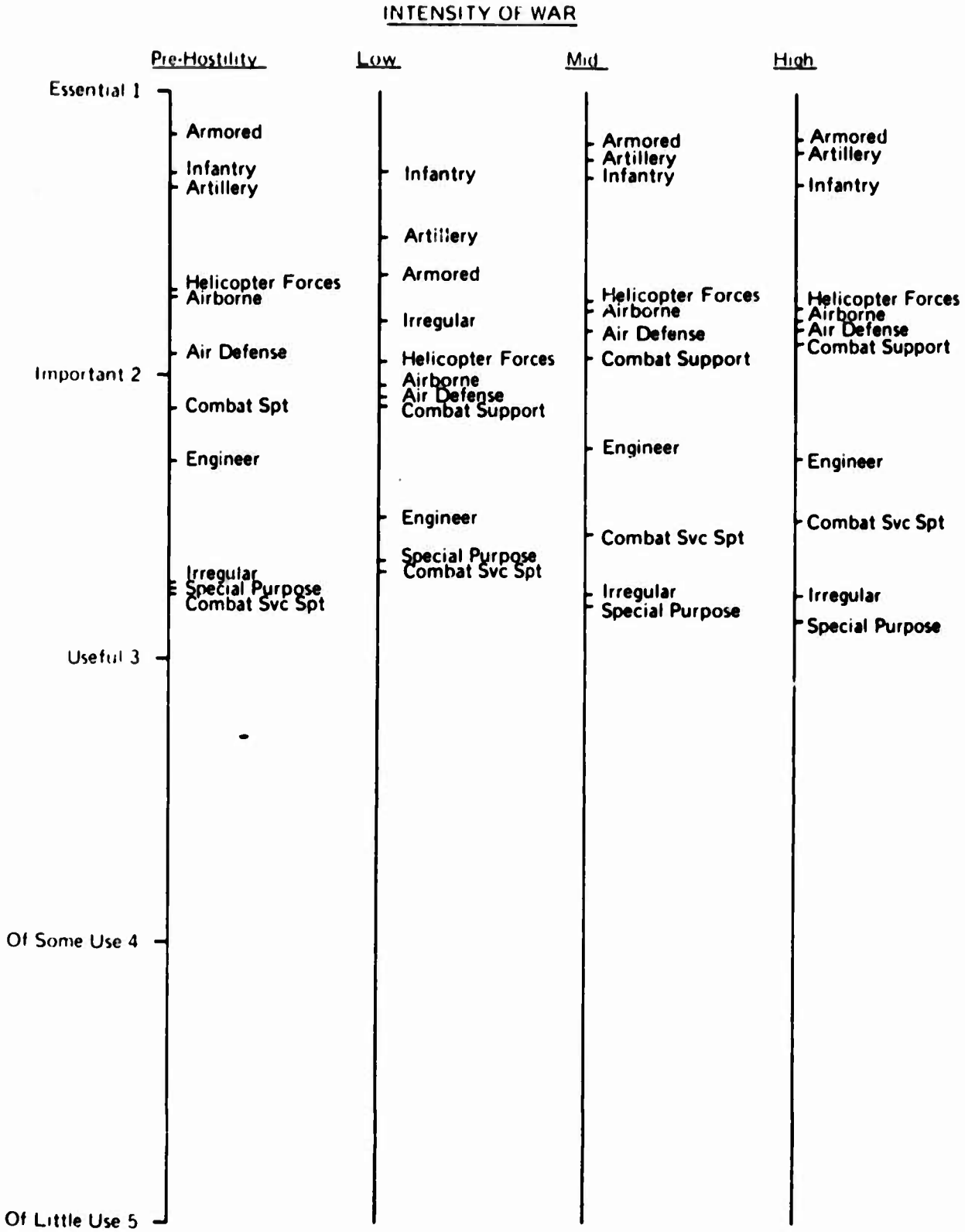


Figure 10. Essentiality Ratings of 11 components of Combat Effectiveness--all respondents.

that such intelligence on armored units was seen as more important than similar intelligence on artillery units.

Although Combat Effectiveness intelligence of helicopter forces was considered slightly more valuable than the Combat Effectiveness of airborne forces in all conditions of war, the ratings are so close that no significant difference exists. Combat Effectiveness intelligence on combat service support units received the lowest essentiality rating in a pre-hostility situation and in low-intensity war, though it was still somewhat above "useful" in value.

Intelligence on enemy engineer units is between "useful" and "important" in essentiality and is lowest in low-intensity war.

The value of intelligence on special purpose units is quite low relative to other components, though it still rates slightly above "useful."

Miscellaneous. This OB element contains those items of intelligence that do not fit into any other category.

The essentiality ratings of the four components of Miscellaneous intelligence follow very consistent patterns, shown in Figure 11. The respondents judged that intelligence on the capabilities of enemy weapons and equipment was close to "essential" in all conditions of war and as such was of substantially higher value than the other three components.

Descriptions of the enemy commanders (Personalities) were judged between "useful" and "important," and intelligence on enemy uniforms and insignia and on unit histories was judged "useful."

Thus, if the critical items of OB intelligence were defined as those with an essentiality rating from "important" to "essential," then only intelligence on weapons and equipment capabilities would be included from the Miscellaneous element.

Analysis of the Responses by Specific Subgroups

The preceding sections presented the essentiality ratings and some forced rankings of the OB elements and components, based on the responses of all 1258 respondents. This section presents the evaluation of the eight OB elements as perceived by: (1) the 56 respondents in Germany vs. all respondents; (2) junior officers vs. senior officers; (3) a Combat Arms group composed of Armor, Infantry, and Field Artillery branch officers vs. a group composed of Combat Support plus Combat Service Support career branch officers; (4) Military Intelligence branch officers vs. the Combat Arms officers; and (5) Armor vs. Infantry vs. Field Artillery vs. all other career branch officers. Data on the evaluation of the separate components of each element is available on computer printouts at ARI.

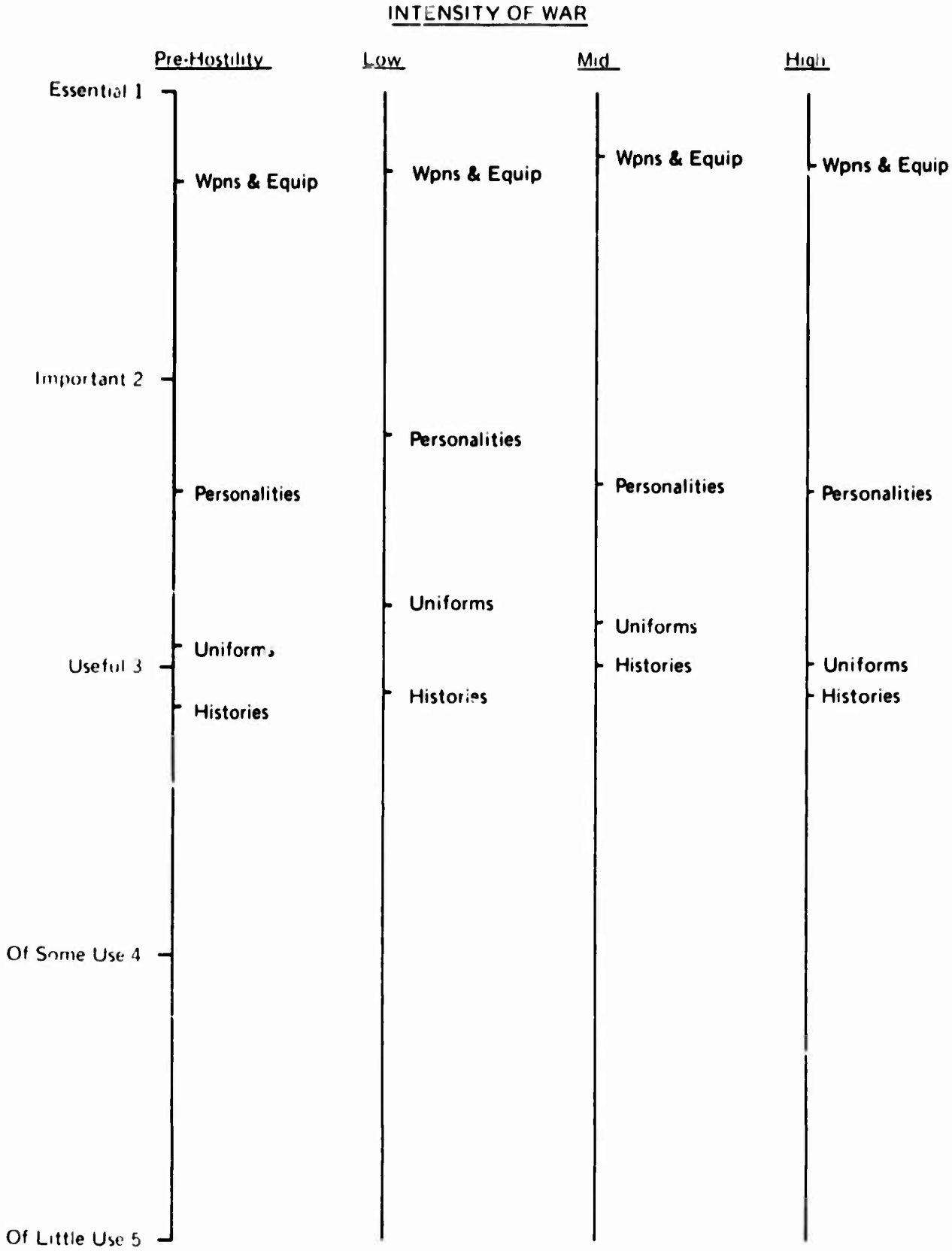


Figure 11. Essentiality ratings of 4 components of Miscellaneous intelligence--all respondents.

Respondents in Germany vs. all respondents. The personnel in Germany were actually facing the possibility of the situations described in the questionnaire and were also currently experienced in USAREUR/Seventh Army problems; the other respondents were more remote. Thus, it was felt that the respondents in Germany might value items of OB intelligence differently from the other respondents even though the others were asked to imagine themselves in the USAREUR/Seventh Army situation.

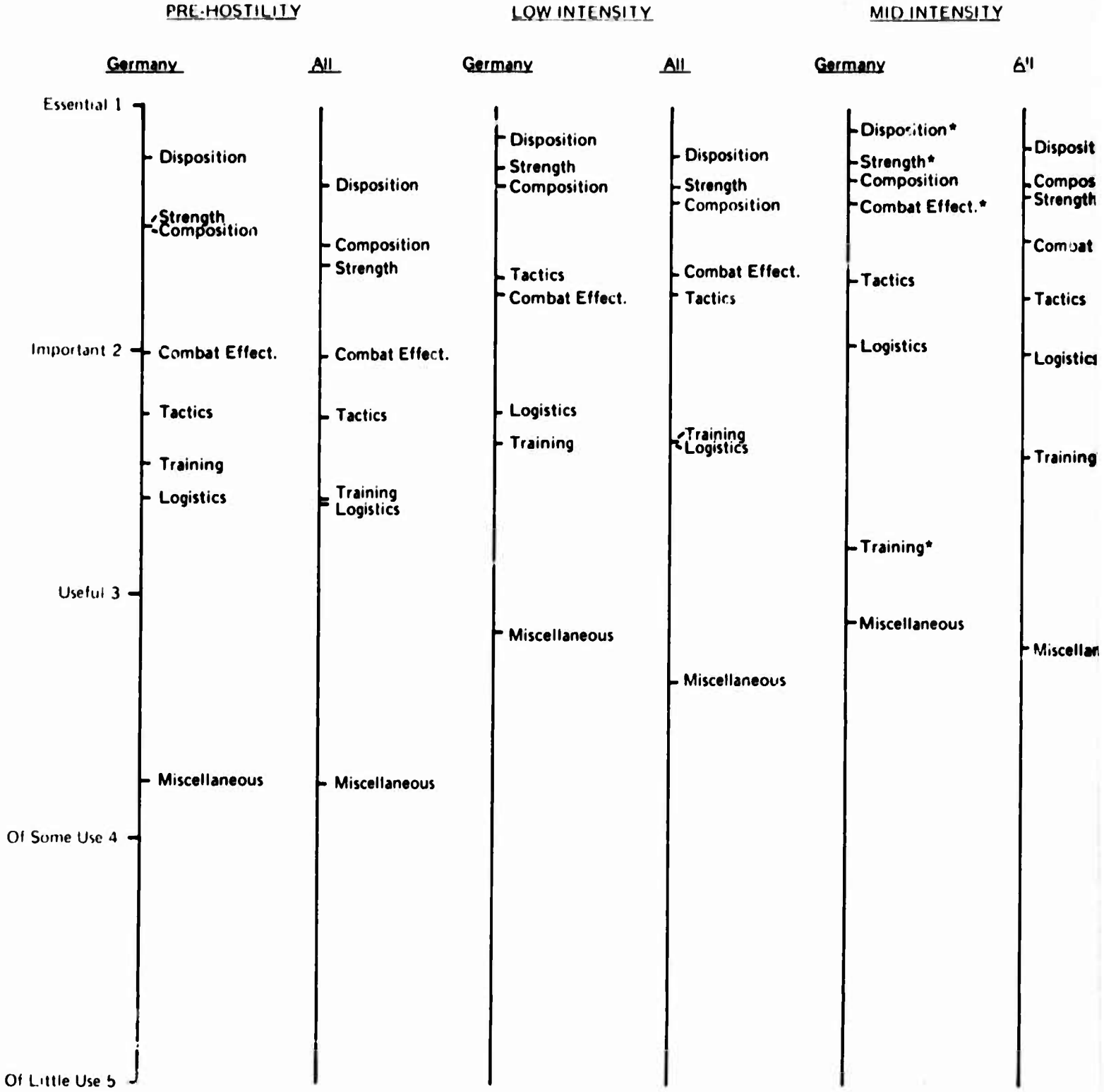
The mean ratings and rankings of the eight major OB elements were derived from the answers of the 56 respondents in Germany and from the answers of all 1258 respondents. Thus, the 1258 respondents include the 56 from Germany. Although this is not the best way to compare the two groups, it was done to avoid an additional computer sort and analysis, and it can be assumed that the 56 respondents in Germany would not materially alter the results. Such a comparison would, in any case, be conservative. As shown in Figure 12, no radical differences existed between the two groups, though some significant differences appear in the mid- and high-intensity war situations.[3]

Figure 12 compares the mean essentiality ratings made by the respondents in Germany with the mean ratings from all respondents for all conditions of war. Although slight differences exist in the mean ratings expressed by the two groups in the pre-hostility and low-intensity conditions, these differences are not statistically significant. In mid-intensity war, the respondents in Germany considered Disposition, Strength, and Combat Effectiveness intelligence significantly more valuable and Training intelligence significantly less valuable than did the respondents as a whole. In high-intensity war, the respondents in Germany considered intelligence on enemy Strength, Composition, and Tactics significantly more valuable than did the respondents as a whole.

Figure 13 presents forced rankings of the OB elements by the two groups. Elements are marked by asterisks where there is significant statistical difference between the rankings provided by the two groups. For example, at the high-intensity level, the respondents in Germany ranked Strength significantly higher and Training significantly lower than did respondents as a whole.

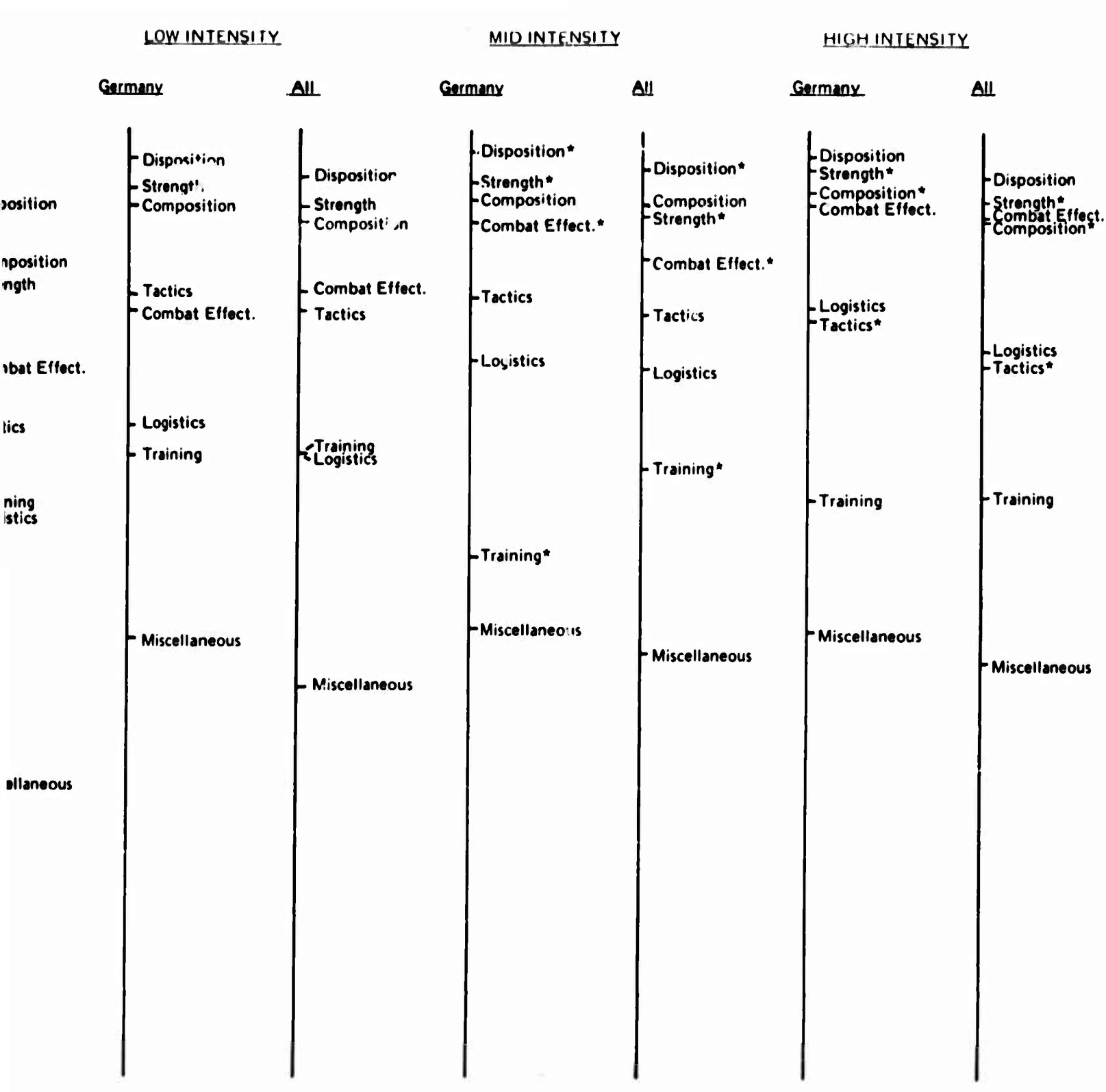
Junior vs. senior officers. The sample contains 34 company-grade officers and 39 colonels (see Table 1). Although neither group is large in relation to the population of 1258 respondents, they are sufficiently large to compare with each other. Such a comparison indicates whether junior and senior officers value OB intelligence differently.

[3] The answers were considered significantly different if the probability of no difference is 0.05 or less.

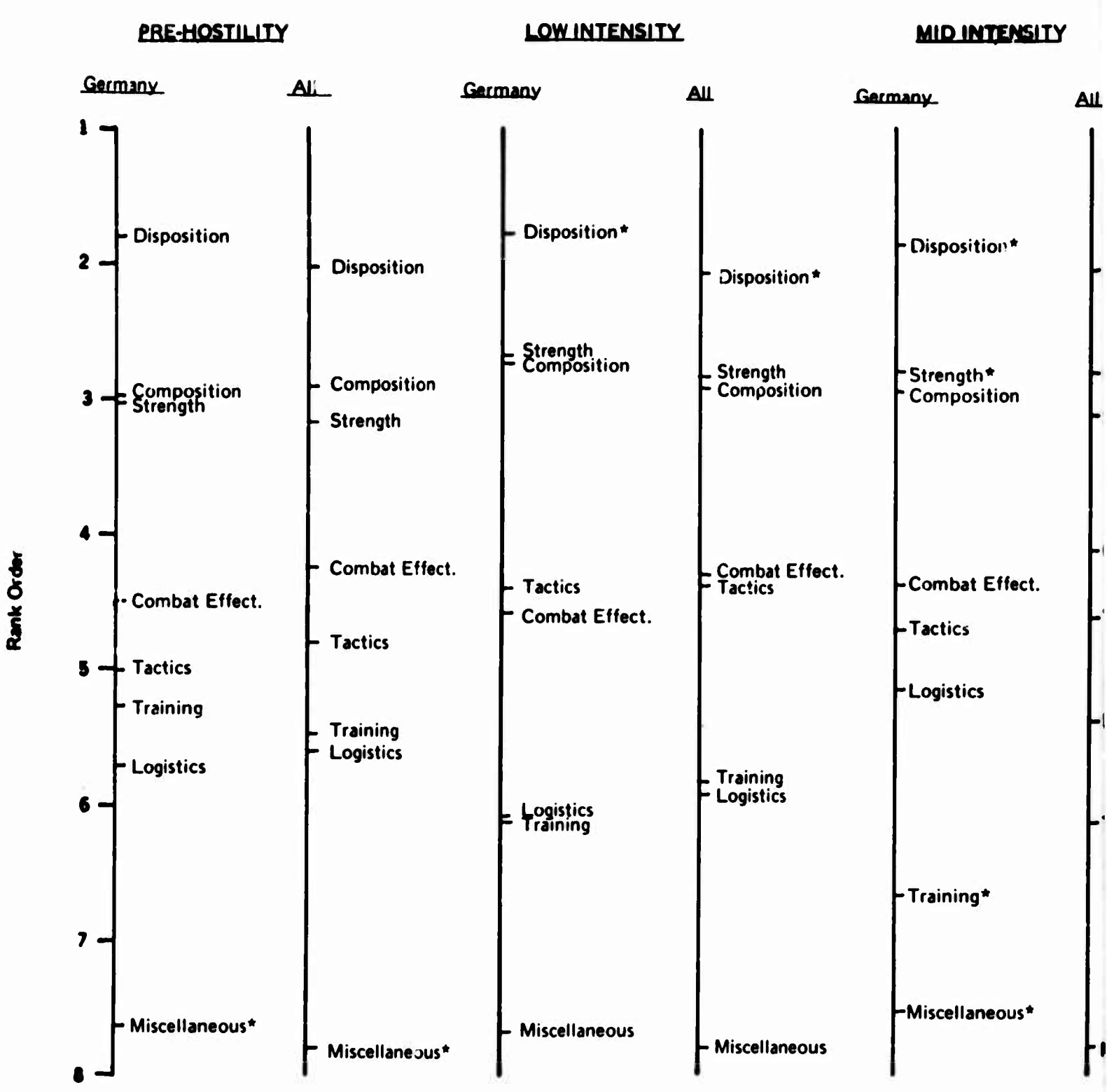


*Significant difference in means within intensity level

Figure 12. Essentiality ratings of 8 OB elements for respondents from Germany vs. all respondents

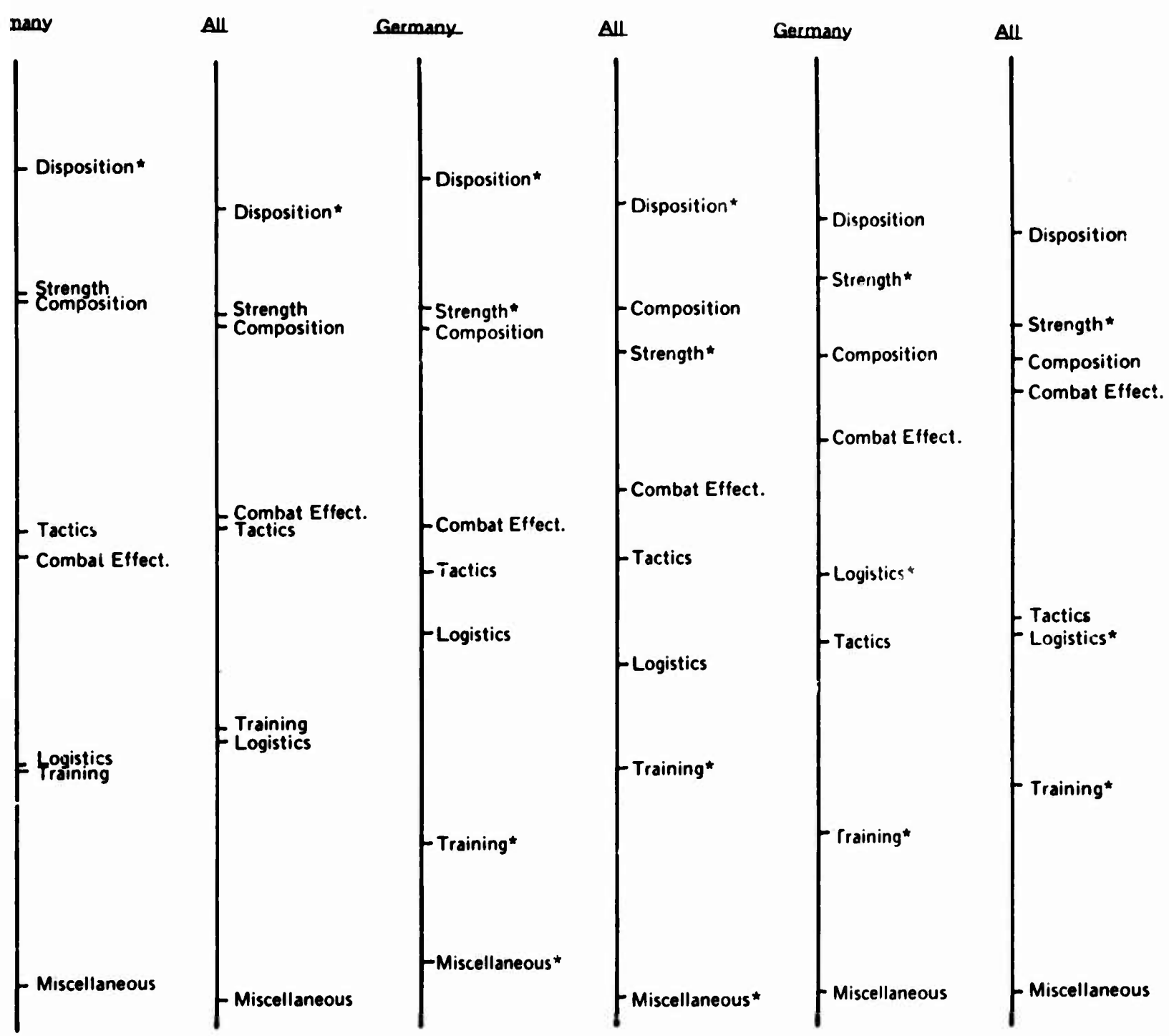


for respondents from Germany vs. all respondents



*Significant difference in means within intensity level.

Figure 13. Forced rankings of OB elements for respondents from Germany vs. all respondents.



nts from Germany vs. all respondents.

As shown in Figure 14, some major differences exist in the responses from these two groups. In a pre-hostility condition the colonels rated Disposition intelligence slightly higher but Strength, Composition, and Combat Effectiveness intelligence substantially lower than did the junior officers, a relation that persists in the low-, mid-, and high-intensity war situations. At the mid- and high-intensity war situations, the colonels also rated intelligence on enemy Tactics substantially lower than did the junior officers.

Combat Arms vs. Combat Support and Combat Service Support. This analysis compares the responses of personnel who are most directly concerned with ground force OB intelligence because of their normal direct contact with enemy ground forces--the Combat Arms branch officers--with the responses of personnel normally not in direct contact with enemy ground forces--Combat Support (CS) and Combat Service Support (CSS) branch officers. In this report Air Defense Artillery officers are grouped with Combat Support because they do not meet our criteria of normal contact with enemy ground forces.

Of the 1247 respondents who identified their career branches, 669 were in what we are defining as the Combat Arms branches, and 578 were in the Combat Support and Combat Service Support categories (Table 5). Figure 15 compares the values that these two groups placed on the eight major OB elements.

The Combat Arms officers consistently valued each OB element slightly higher than did the CS and CSS respondents. In only two instances (Tactics and Miscellaneous in Pre-Hostility) did the Combat Arms officers rate an OB element lower than the CS and CSS officers rated it.

The order in which the two groups valued the elements is also consistent; in only two instances is there a reversal in order--in the low-intensity situation the groups differ on the order of Training and Logistics and in the high-intensity situation they differ on the order of Composition and Combat Effectiveness.

Military Intelligence branch vs. Combat Arms respondents. An officer whose career branch was Military Intelligence (MI) could interpret his role in the four scenarios as either that of the supplier of OB intelligence to the G2 and to other staff elements, or that of the primary "consumer" of the OB product. Figure 16 compares ratings given by MI officers with those by Combat Arms officers. Results indicate that MI officers valued OB elements consistently more highly than did Combat Arms officers, with some exceptions such as Training intelligence in low-, mid-, and high-intensity war. Combat Arms officers valued these elements more than officers in support branches did; MI officers in our sample therefore must have considered OB more essential than any other officers did. Thus, officers whose jobs are most likely to involve OB intelligence tend to value the OB elements most.

Armor vs. Infantry vs. Field Artillery vs. Support branches. A previous section demonstrated that Combat Arms officers as a group generally rated all OB elements more valuable to their jobs than did the

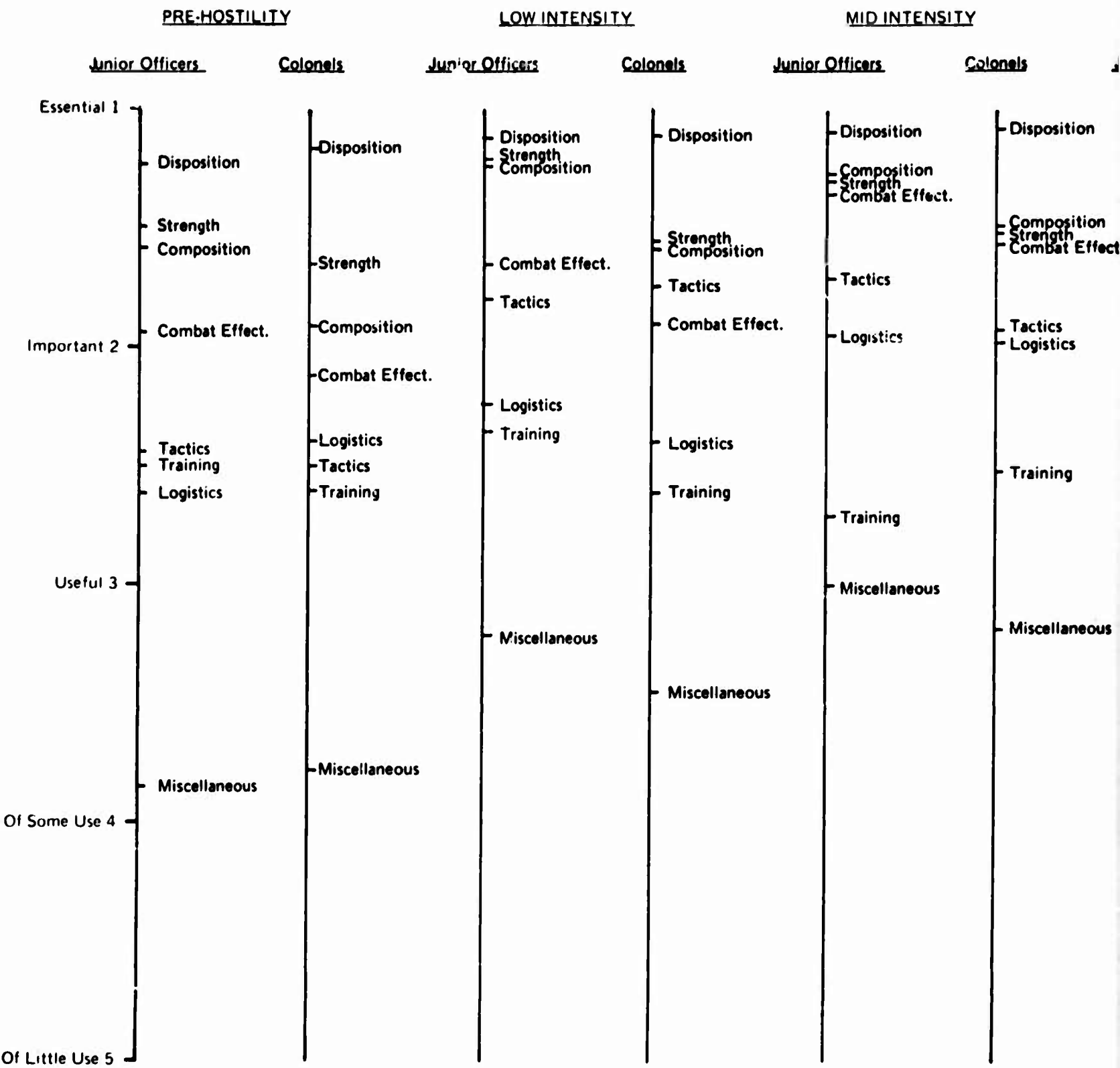
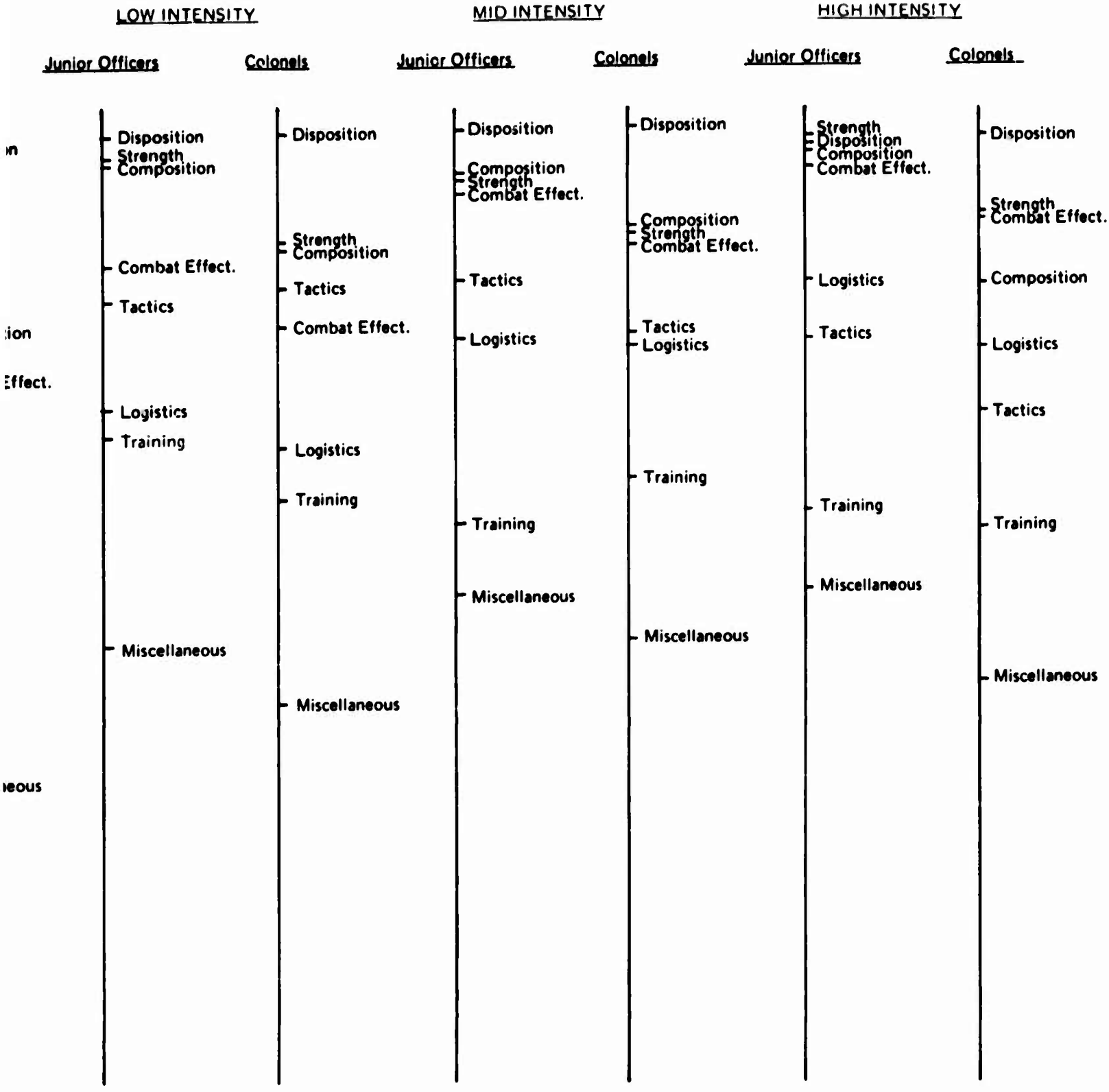


Figure 14. Essentiality ratings of 8 OB elements for lieutenants and captains vs. colonels.



or lieutenants and captains vs. colonels.

Table 5

RESPONDENTS BY CAREER BRANCH CATEGORY
(N = 1247)

COMBAT ARMS		COMBAT SUPPORT		COMBAT SERVICE SUPPORT	
Branch	n	Branch	n	Branch	n
Armor	114	Air Defense Artillery	93	Military Police	35
Field Artillery	209	Engineer	90	Transportation	66
Infantry	346	Signal	89	Ordnance	8
		Military Intelligence	98	Quartermaster	57
		Chemical	20	Medical Service	21
				Adjutant General	1
Total	= 669	Total	= 390	Total	= 188

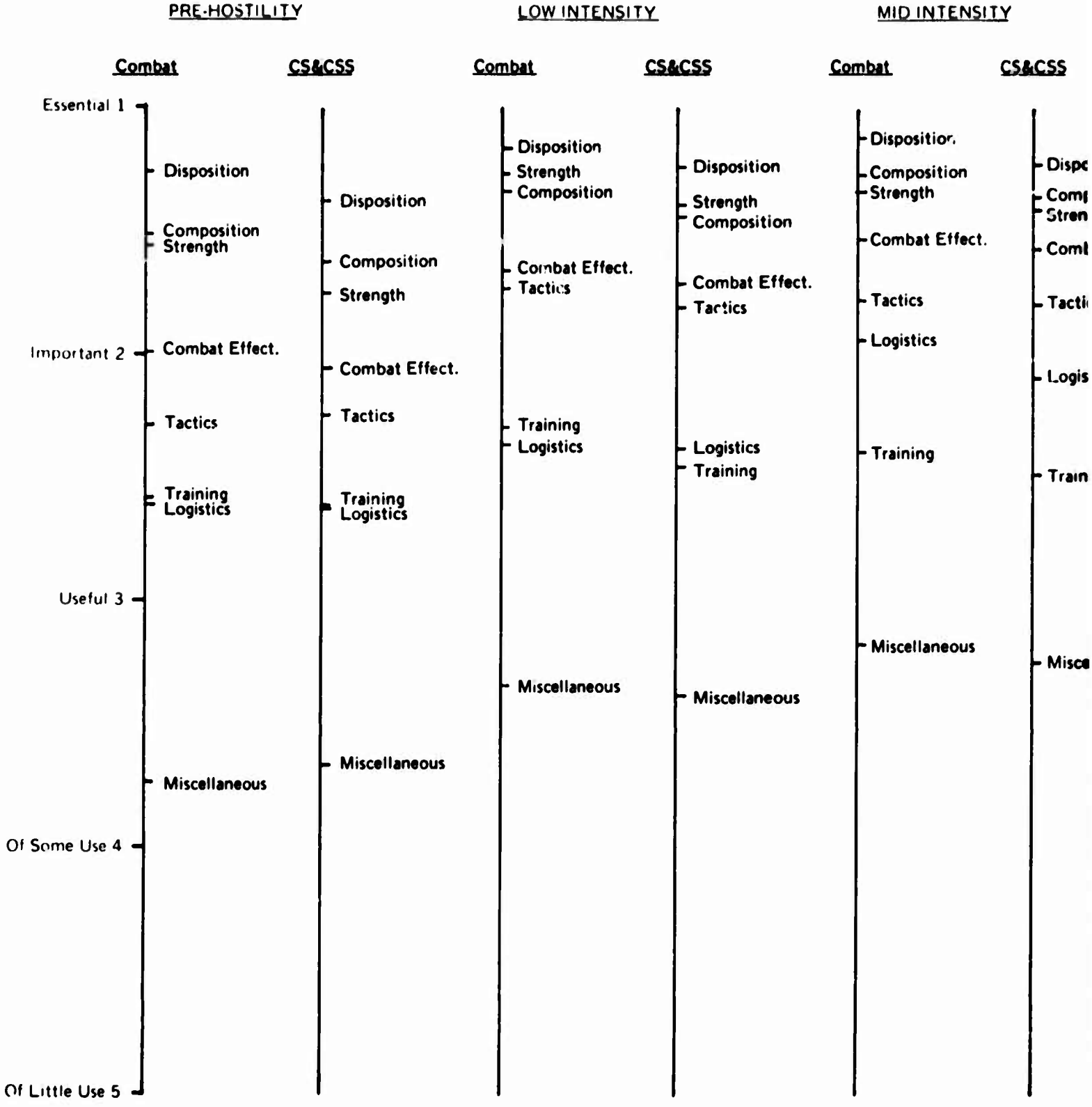


Figure 15. Essentiality ratings of 8 OB elements for Combat Arms branch officers vs. Combat Support and Combat Service Support branch o

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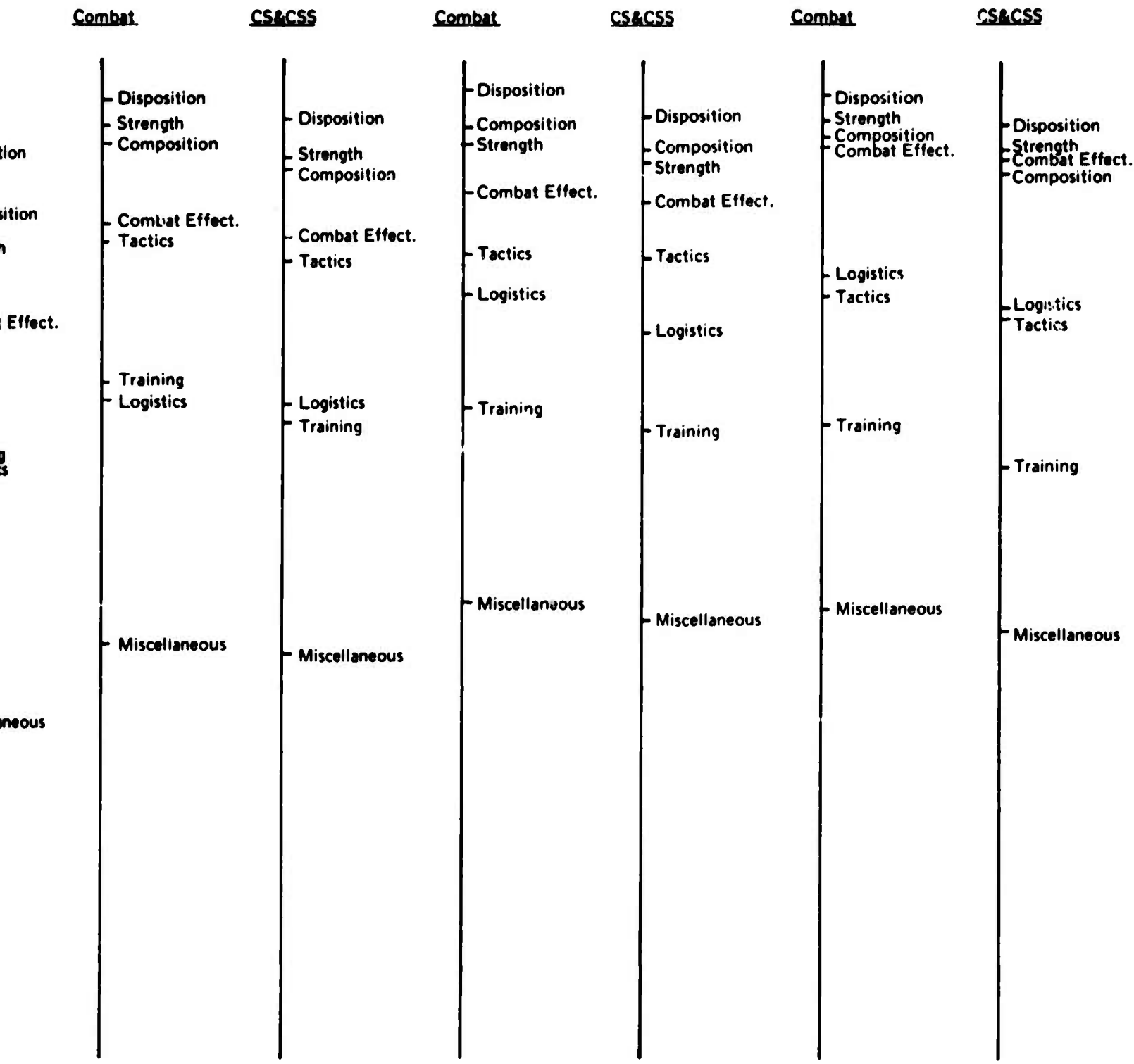


r Combat Arms branch officers vs. Combat Support and Combat Service Support branch officers.

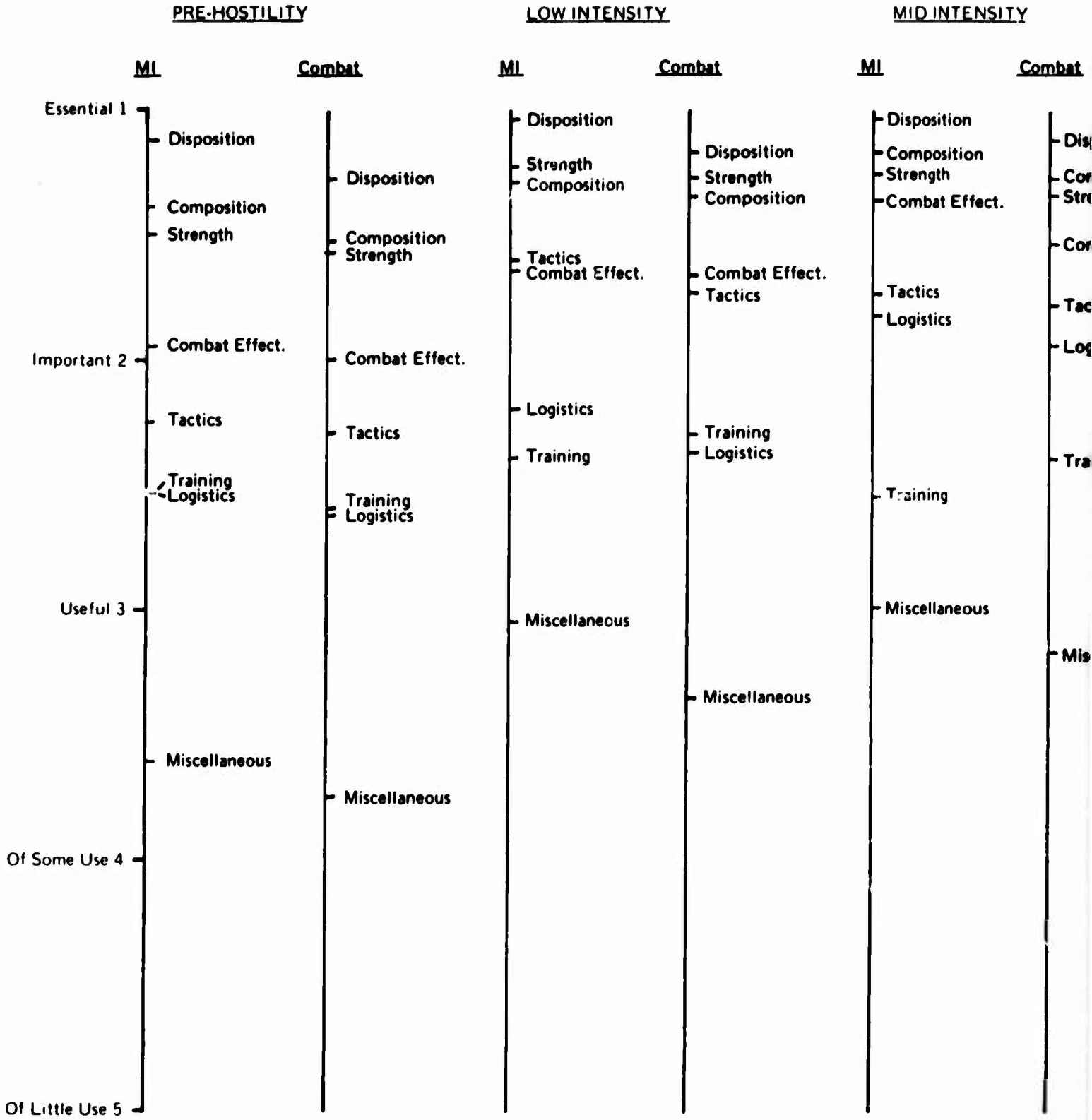
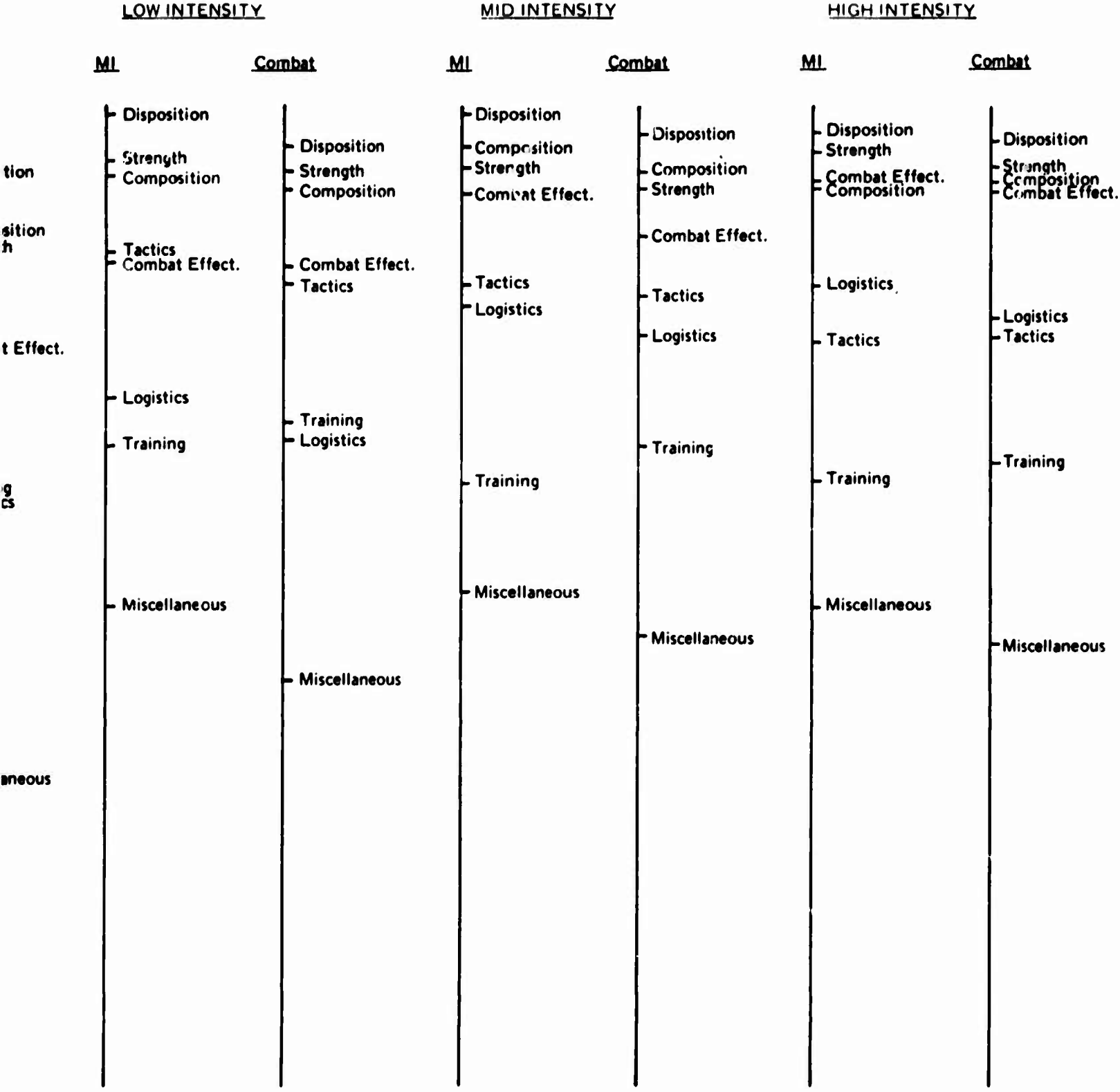


Figure 16. Essentiality ratings of 8 OB elements for Military Intelligence branch vs. Combat Arms respondents.



or Military Intelligence branch vs. Combat Arms respondents.

support branches. Figures 17 and 18 present a finer analysis of the responses in a grouping of the Combat Arms officers into Armor, Artillery, and Infantry for separate comparisons of essentiality ratings with each other and with the support branches.

In the pre-hostility situation, perhaps the most surprising result is that field artillery officers did not consider Disposition intelligence particularly more valuable than did armor or infantry officers. Infantry officers valued Disposition and Strength intelligence more than other officers. Comparisons reveal few other major differences, except that armor officers considered Logistics intelligence more valuable than other branch personnel did.

In a low-intensity war condition the Combat Arms ratings are similar for the top three elements, Disposition, Strength, and Composition. The armor officers placed more emphasis on Combat Effectiveness, Tactics, and Logistics intelligence than other branches did. Infantry officers placed more emphasis on enemy Training than did the armor, artillery, or support branches.

In the mid-intensity war condition the armor officers tended to rate each element as slightly more valuable than did other branch officers. As noted above, the armor officers rated intelligence on the enemy's Tactics and Logistics more essential to their jobs than did infantry, artillery, or support branch personnel.

In the high-intensity war situation armor officers again tended to value every element of OB more than other branch officers. Also, the armor officers again considered intelligence on enemy Logistics much more valuable than did the other respondents. Armor officers also disagreed with everyone else on the relative rank of Composition and Strength in high-intensity war.

DISCUSSION

A very high level of agreement was shown across all respondents and all scenarios on the relative value of most OB elements. Effectiveness ratings followed consistent patterns, which were generally confirmed by the patterns of forced rankings.

Intelligence on the Disposition (location and designation) of enemy forces was consistently rated the most valuable element in all four intensity levels of war by all respondents; Composition and Strength were rated next in value. The mean perceived value of intelligence on Combat Effectiveness and Logistics increased with increasing intensity of war; that on Tactics and Training peaked at the low-intensity level. Intelligence in the Miscellaneous category was consistently rated least valuable in all conditions of war, but no item of intelligence in any condition of war was considered less than "of some use" to the respondents.

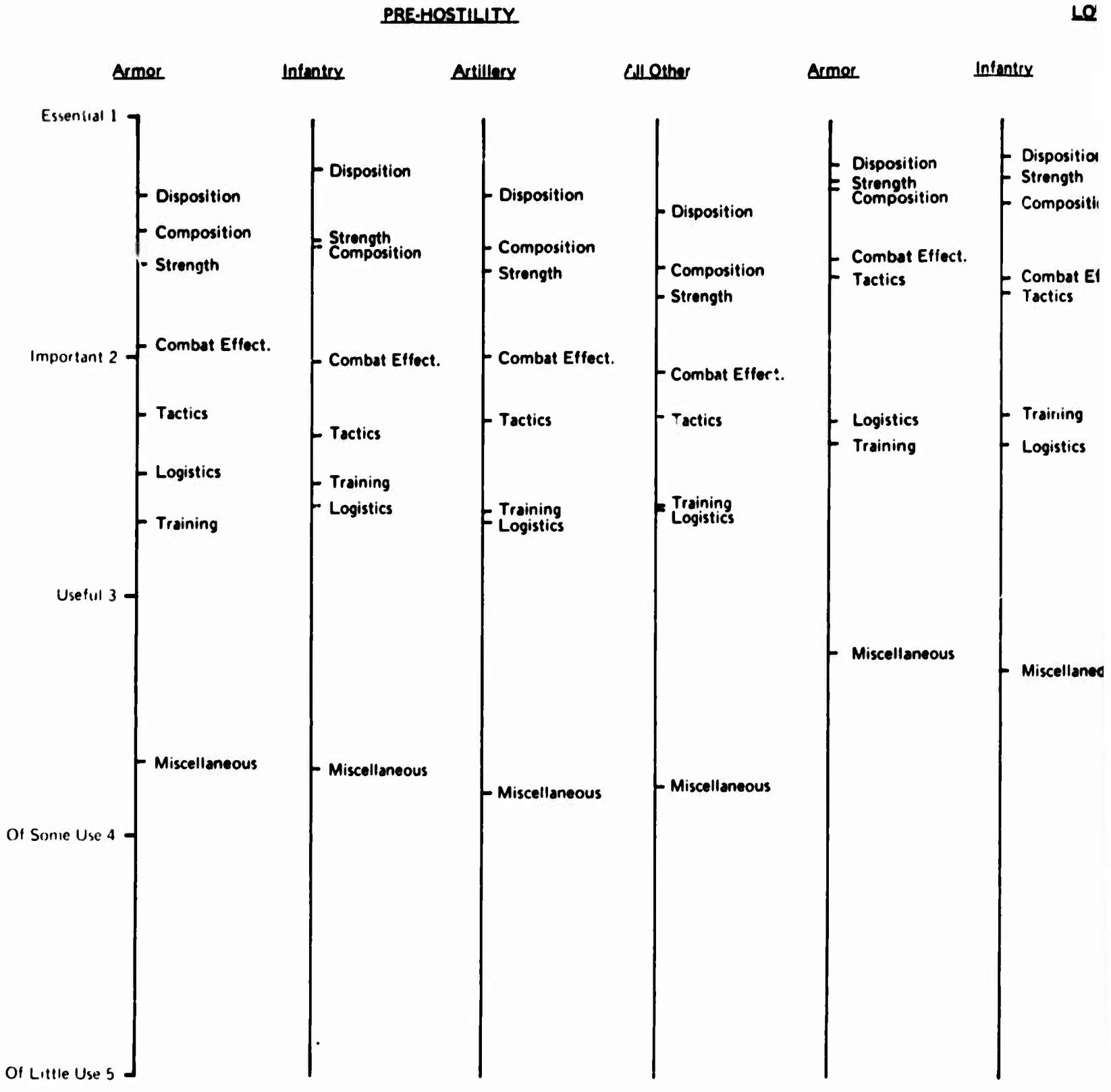


Figure 17. Essentiality ratings of 8 OB elements in Conditions I and II for Armor vs. Infantry vs. Field Artillery vs. Support branches.

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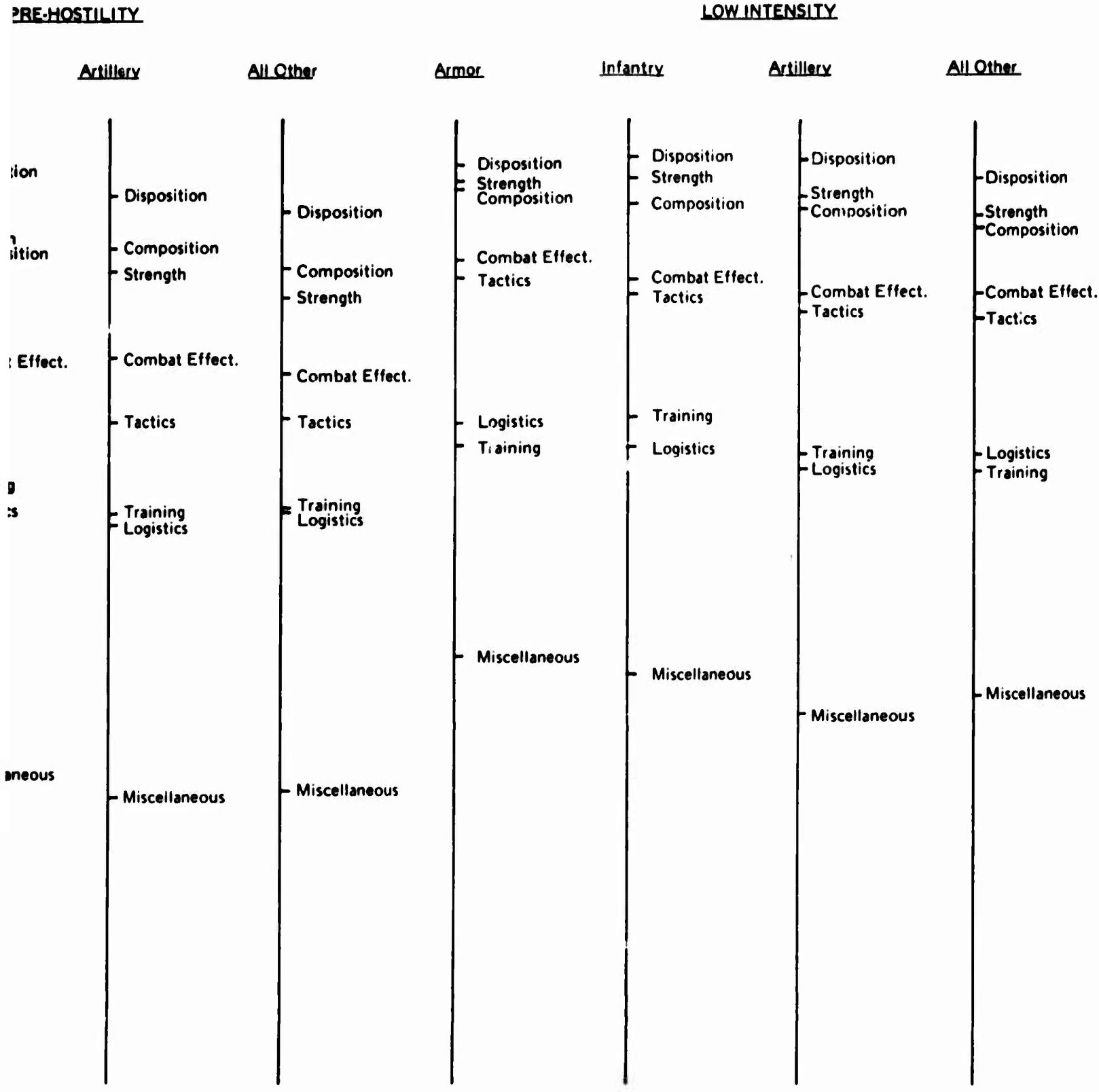


Conditions I and II for Armor vs. Infantry vs. Field Artillery vs. Support branches.

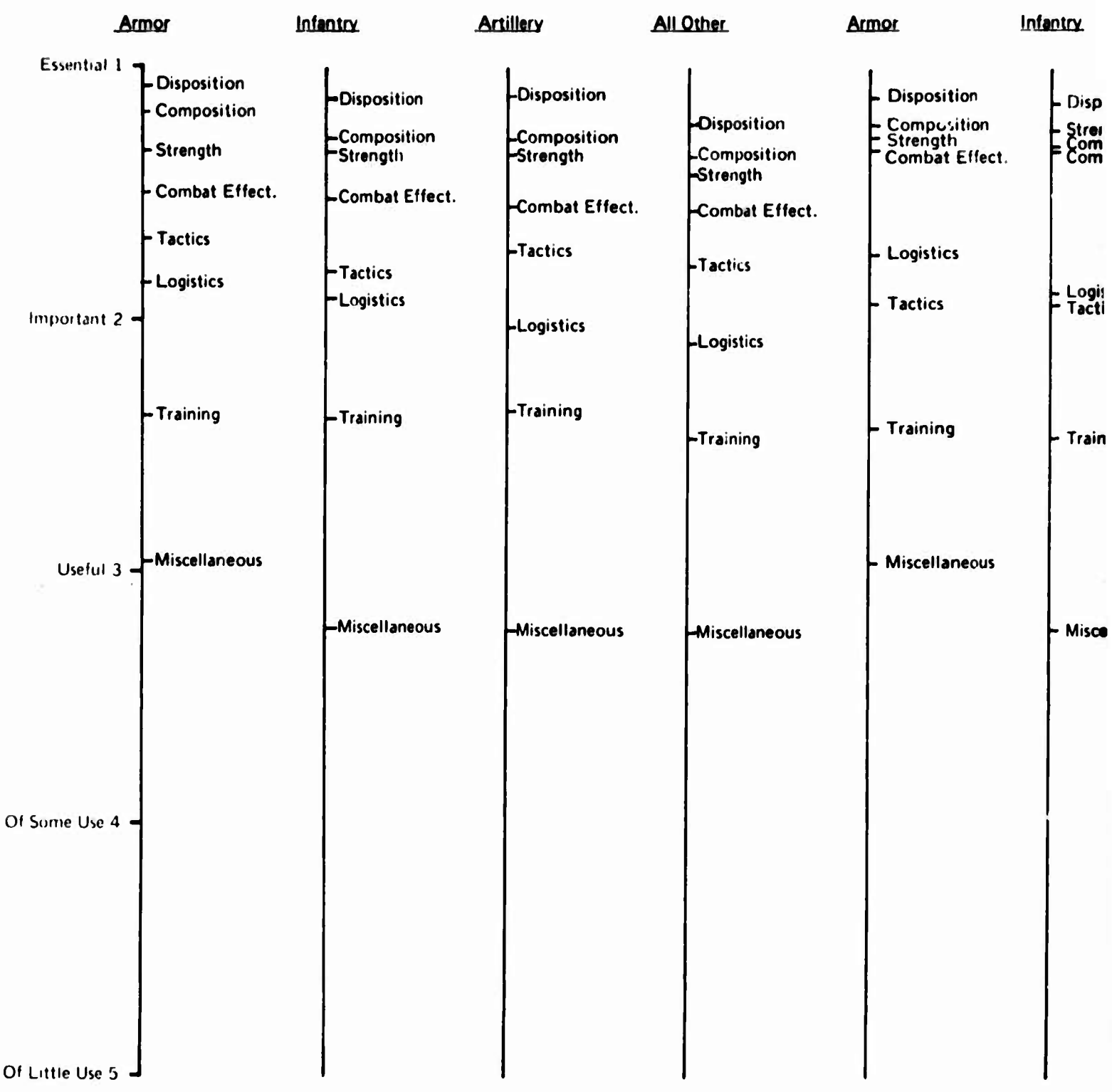
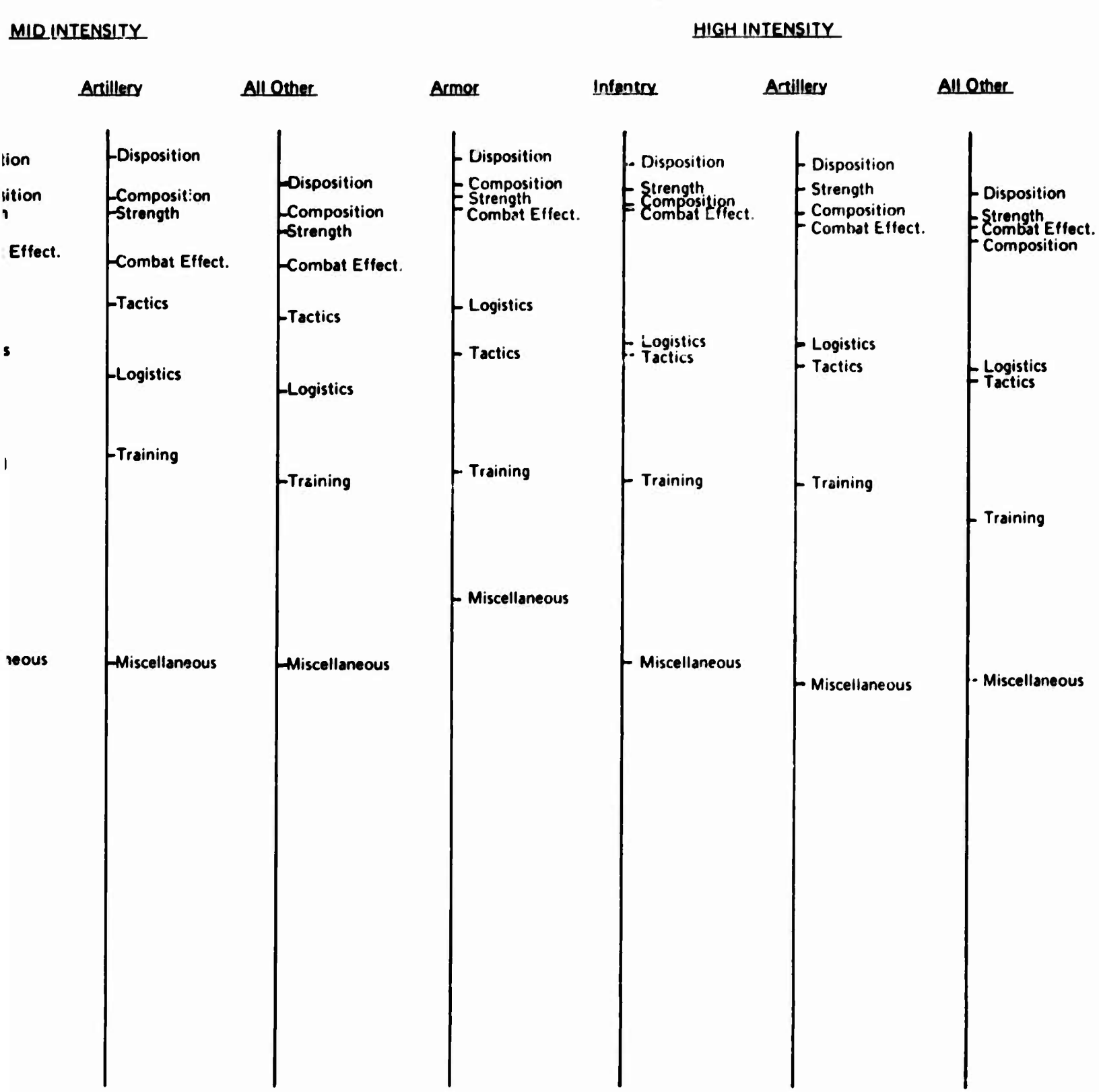


Figure 18. Essentiality ratings of 8 OB elements in Conditions III and IV for Armor vs. Infantry vs. Field Artillery vs. Support branches.



Conditions III and IV for Armor vs. Infantry vs. Field Artillery vs. Support branches.

In a war situation, the critical elements (i.e., those rated "essential" or "important") included intelligence on enemy Disposition, Strength, Composition, Combat Effectiveness, and Tactics. Logistics intelligence qualified as critical only in high-intensity war.

In rating the components of each element, Disposition, Composition, and Combat Effectiveness intelligence was consistently rated more valuable for enemy Armor, Artillery, and Infantry units than similar intelligence on other kinds of units in all conditions of war. Respondents assessing the components of Strength intelligence were most concerned with the number of enemy artillery weapons and ammunition in all conflict levels except high intensity, where enemy CBR weapons and munitions strength became the most valuable. Intelligence on the training of enemy combat units was considered substantially more valuable than intelligence on training of other kinds of units or other types of training intelligence. Knowledge of the enemy's tactics for nuclear operations was rated more valuable than knowledge of his tactics for other kinds of operations, except in low-intensity war. Intelligence on enemy troop and supply movement was consistently rated more valuable than other kinds of Logistics intelligence. In the Miscellaneous element, intelligence on the capability of enemy weapons and equipment was judged very important and substantially more valuable than knowledge of the enemy commander's personality, or of enemy uniforms or unit histories.

Military Intelligence officers consistently rated every OB element except Training as more valuable than Combat Arms officers did. In turn, Combat Arms officers consistently rated every OB element as more valuable than support officers did. Officers' rank and their location in schools or in Germany generally did not seem to affect their evaluations; officers perceived OB intelligence as important in fairly direct proportion to how closely they worked with it.

IMPLICATIONS AND AREAS FOR FUTURE RESEARCH

Intelligence collection programs and platforms are often quite different for different OB elements and components. In this study, the ratings and rankings of the OB components were determined from respondents' rating of each component in an element. Therefore, the values of two components in the same element can readily be compared, but the value of a component in one element cannot be compared to the value of a component in another element because a valid common scale does not exist. Development of a value system common to all OB components would permit comparison of different collection programs and platforms in terms of the value of OB intelligence they provide. Research to generate a scale common to all 95 components would enable such overall figures of merit to be constructed.

When these figures of merit have been developed and analyzed, a further area of research would include analyzing implications of the results for all stages of the intelligence cycle. Thus, the results

of the overall values accorded each OB component should be relevant not only to collection programs, but to production and dissemination of intelligence.

The analyses initiated in this study might also be continued to include assessment of values expressed by selected groupings of respondents not analyzed in this study. Particularly, the last duty assignments of respondents, collected but not used here, could be codified and integrated into the data base. Analyses of these assignment data could then be conducted to determine if groups of respondents with different current or past duty assignments value OB intelligence differently.

Finally, the basic structures and definitions of Order of Battle intelligence require revision. Not only is OB handled in a static way; not only does the category of Miscellaneous contain one very important and three much less important components; but Combat Effectiveness is considered a separate major element while being derived from parts of other major elements. Analysis should be aimed at possible restructuring and redefining of all items that constitute combat intelligence, including not only OB, but also indicators of hostility, target acquisition, mapping and charting, weather, and scientific and technical intelligence. The objective of such a study would be to provide our commanders with a more useful, usable, and comprehensive body of intelligence on the enemy they face and on the environment in which they must face that enemy.

APPENDIXES

APPENDIX A THE DATA COLLECTION QUESTIONNAIRE AND DATA STORAGE

QUESTIONNAIRE

The questionnaire was distributed to officers and NCO's in Germany and to U.S. Army officer students at the Army Command and General Staff College, Army War College, and National War College. Of the questionnaires distributed and completed, the 1258 which provided usable data are the basis for this report.

The questionnaire provided background and instructions for completing the document, requested information identifying the respondent, and presented the forms for rating and ranking each OB element and the various components that constitute the eight elements in four conditions of warfare. The questionnaire defined four levels of hostility involving USAREUR/Seventh Army forces and requested ratings for each hostility level. The hostility levels were: peacetime increased-tension situation in Europe, low-intensity war in the Mid-East involving USAREUR forces, mid-intensity war in Europe using conventional weapons, and high-intensity war in Europe using nuclear weapons and CBR agents.

For each hostility level, the respondent judged the value he placed on the eight major elements of OB and on the components of each element, which are described in the attached questionnaire.

ELEMENT	NUMBER OF COMPONENTS
Composition	11
Disposition	24
Strength	23
Training	10
Tactics	6
Logistics	6
Combat Effectiveness	11
Miscellaneous	4

The judgments of value had two parts, how essential the intelligence item was to the respondent, and what rank order the item would have compared with other items in its category. Essentiality was measured on a 5-point rating system where 1 indicated that the intelligence item is "essential," 2 that it is "important," 3 "useful," 4 "of some use," and 5 "of little use." Two or more items within a category could receive the same essentiality rating if the respondent felt that the items were equally essential to his job; in any case there were usually more items to be rated than the five measures of essentiality. For example, when a respondent rated the value of the eight major OB elements (at a given intensity level), he might indicate that Composition, Disposition, and Strength intelligence were "essential" to his job, Tactics and Combat Effectiveness were "important," Logistics was "useful," Training was "of some use," and Miscellaneous intelligence was "of little use."

After the respondent had defined how essential the items were, he was asked to compare all items within the category and to indicate their relative importance. In the example of this forced ranking shown below, while Composition, Disposition, and Strength are all considered "essential" their relative value is ordered as Disposition, Strength, Composition.

EXAMPLE OF ESSENTIALITY AND FORCED RANKING VALUES

	Essentiality Rating	Forced Ranking
Composition	1	3
Disposition	1	1
Strength	1	2
Training	4	7
Tactics	2	5
Logistics	3	6
Combat Effectiveness	2	4
Miscellaneous	5	8

The same procedure for indicating value was utilized for the components within each OB element. Thus, the 11 intelligence components within the element Composition were each assigned an essentiality rating and were ranked from 1 to 11, using the procedure described above.

When the questionnaire was completed, the respondent had defined the essentiality and forced rank of the eight OB elements and the 95 components that make up these elements, in each of four possible intensity levels of war. These values were then stored on computer tape.

DATA STORAGE

The data from each questionnaire were keypunched onto 21 computer cards and these cards read onto a tape. Each line of a printout of the tape corresponds to a data input card. The first card or printout line per respondent, called "identifier," contains the respondent's source group, rank, branch of service, and current or last duty assignment. Cards or lines 2 through 6 contain the essentiality ratings and forced rankings of the 8 OB elements and 95 components in a pre-hostility situation. Cards or lines 7 through 11 contain the essentiality ratings and forced rankings for the OB elements and components in low-intensity conflict. Cards or lines 12 through 16 contain the ratings and rankings for mid-intensity war, and cards 17-21 contain similar data for high-intensity war. Since cards 2-6, 7-11, 12-16, and 17-21 contain the same kind of data and use the same format, a description of one group is appropriate for all four groups.

Identifier (1st Card or Line)

The first of the 21 data cards per questionnaire utilizes 9 columns to describe the respondent. The first 4 of the 9 columns identifies the respondent numerically, and indicates the respondent's source group. The table below identifies the numbers allocated for the various source groups.

Numbers Allocated	Respondent's Source Group
0001 to 0099	Corps and Divisions in Germany
0100 to 0199	National War College
0200 to 0399	U.S. Army War College
0500 to 1999	U.S. Army Command & Staff College

The fifth column of the identifier card indicates the respondent's rank, on the basis of the following system.

Numeral	Rank
0	Unidentified
1	Enlisted & Warrant Officer
2	Lieutenant (2nd and 1st)
3	Captain
4	Major
5	Lieutenant Colonel
6	Colonel
7	General
8	Civilian

The sixth and seventh columns of the identifier card indicate the career branch of the respondent in accordance with the following system. Note that all Army career branches are not used because questionnaires were not requested from officers that do not normally use OB intelligence in the course of their duties.

Numeral	Branch	Numeral	Branch
00	Unidentified	07	Military Police
01	Armor	08	Military Intell.
02	Field Artillery	09	Chemical
03	Air Defense Art.	10	Transportation
04	Infantry	11	Ordnance
05	Engineer	12	Quartermaster
06	Signal	13	Medical Services
		14	Adjutant General

The eighth and ninth columns were to indicate the current duty assignment of respondents in Germany and last duty assignment of officer students at the military schools. The identification system for respondents in Germany is shown in the table below. The last duty assignment of the student respondents could not be implemented due to a lack of

assignment specificity by the respondents. Thus, the last duty assignment of all respondents at the military schools is keypunched double zero to indicate Unidentified.

Numeral	Duty Assignment
00	Unidentified
01	Division G2
02	Corps G2
03	Field Army G2
04	Division G3
05	Corps G3
06	Field Army G3

Therefore, the nine columns or numerals 005630802 would identify the 56th respondent from USARERU/Seventh Army, who is a captain with a military career branch of military intelligence, currently assigned to a Corps G2 staff.

2nd Card or Line

The second computer card, or second line of data on a printout, defines the essentiality ratings and forced rankings of the eight OB elements and the 11 components of Composition intelligence. These data utilize 53 columns of the computer card, including the non-numeric separators. The example below indicates that the first eight columns present the essentiality ratings of the eight elements of OB, followed by a non-numeric separator (a slash). The next eight columns present the forced rankings of the eight OB elements, followed by a non-numeric separator (a less-than-or-equal-to symbol).

EXAMPLE OF CARD 2 DATA

11223345/12345678≤11122334455/01020304050607080910 11≤

OB-ER (8) OB-FR (8) COMP-ER (11) COMP-FR (22)

The next 11 columns present the respondent's essentiality ratings of the 11 components of Composition intelligence, followed by a non-numeric separator (a slash). The next 22 columns (the last group of numerics) present the forced rankings of the 11 components of Composition intelligence, followed by a non-numeric terminator (≤). Since the forced rankings in this case go up to a two-digit number (i.e., up to 11), two columns are required for each forced ranking.

Note that the order of data on the computer cards and on the printout is based on the order of the questionnaire.

Card 2 presents the ratings and rankings for the OB elements and the components of Composition intelligence in a pre-hostilities situation. Cards 7, 12, and 17 (lines 7, 12, and 17 of a printout) present the same kind of data for low, mid, and high intensity war, respectively.

3rd Card

The 3rd computer card and line on a printout present the essentiality ratings and forced ranking of the 24 components of Disposition intelligence. Since the essentiality ratings are only one-digit numbers (a 1, 2, 3, 4, or 5), the first 24 columns present these ratings for the 24 components. Since the forced rankings go up to two-digit numbers (i.e., up to 24), 48 columns are required for the forced rankings.

These 72 columns for numeric data, plus a non-numeric separator between the ratings and rankings, plus a non-numeric terminator, yield a field length of 74 columns.

Cards 8, 13, and 18 (lines 8, 13, and 18 of a printout) have an identical format, but express the respondent's opinions for low, mid, and high intensity war situations, respectively.

4th Card

The 4th card and line on the printout present the essentiality ratings and forced rankings of the 23 components of Strength intelligence. The first 23 columns present the essentiality ratings; then there is a non-numeric separator followed by 46 columns for the two digit forced rankings. These 70 columns and the non-numeric terminator yield a total field length of 71 columns.

Cards 9, 14, and 19 (lines 9, 14, and 19 of a printout) are for the other three intensity levels of war.

5th Card

The 5th card and line on the printout present the ratings and rankings of the 10 components of Training intelligence, the 6 components of Tactics intelligence, and the 6 components of Logistics intelligence. Since only the forced rankings of the components of Training intelligence require two-digit entries, the components of three OB elements were entered on this one card as shown in the following example:

EXAMPLE OF CARD 5 DATA

11223344/0102030405060708091011223344/123456≤112345/123456≤

Training-ER Training-FR Tac-ER Tac-FR Log-ER Log-FR

The field length of the card is 60 columns including the non-numeric separators and terminator. Cards 10, 15, and 20 (lines 10, 15, and 20 on a printout) follow an identical format, but the values of the ratings and rankings reflect the respondent's opinions for low, mid, and high intensity war situations, respectively.

6th Card

The 6th card and line on a printout reflect the essentiality ratings and forced rankings of the 11 components of Combat Effectiveness intelligence and 4 components of Miscellaneous OB intelligence. These numerics and the non-numeric separators and terminator yield a computer card field length of 45 columns.

Cards 11, 16, and 21 (lines 11, 16, and 21 of a printout) are identical in format, but indicate the respondent's opinions for low, mid, and high intensity war, respectively.

QUESTIONNAIRE EXAMPLE

The following is an abridged copy of one of the questionnaires that was used to collect the data presented in this report. Because the blank forms are identical for each of the four scenarios, only Scenario I is reproduced completely here, with the descriptions defining Scenarios II, III, and IV.

PERCEIVED VALUE
OF
ORDER OF BATTLE INTELLIGENCE

BACKGROUND

The attached questionnaire will, when completed, provide a valuable input to the Collection Systems Integration (COSINT) study, which was directed by the Chief of Staff of the Army and which is being conducted by the Research Analysis Corporation (RAC). The geographic focus of the COSINT study is Europe.

The results gained from analysis of these questionnaires should provide insight into the relative values of the various elements of order of battle (OB) intelligence, as perceived by experienced Army officers.

Questionnaires similar to the attached have already been completed by officers assigned to various organizations in Germany. The results of analyses of the completed questionnaires have been very enlightening and informative, but the final conclusions will be materially improved with the results of this larger sample size. Therefore, to add breadth and depth to the analysis, the incoming officer students of the Army War College and the Command and General Staff College are being asked to complete these questionnaires.

GENERAL INSTRUCTIONS

In the indicated position at the top of Scenario I, Part 1, give your name, rank, branch of service, and last duty assignment in general terms (e.g., DivArty XO, Corps G2 Air, Bn CO) without identifying specific unit (e.g., 101 Div, 1st Bn 10th Inf.). These data (other than name) will be used to determine if specific groups of officers (for example by branch) value the various elements of order of battle differently.

In completing this questionnaire, please express your own independent opinion.

The basis for your approach to this questionnaire should be: You have been recently assigned to a staff position (commensurate with your rank, branch and experience) in Germany; what elements and components

of OB intelligence do you most need to do your job in that environment? This mental approach allows you to assume that you know relatively little (or are not current) about the enemy ground order of battle, and to express which pieces of intelligence you consider most important, next most important, and so on, for you to accomplish the duties of your new assignment.

SPECIFIC INSTRUCTIONS

Part 1

Part 1 presents, for each of the four scenarios, the eight major elements of order of battle. A brief description of these major elements is presented following these instructions. The individual components of each element are shown in Part 2.

On Part 1 put in the appropriate blank your opinion of how essential each element is according to the following scale of values, entering the applicable number in the column labeled "Essentiality Rating."

1 = Essential
2 = Important
3 = Useful
4 = Of some use
5 = Of little use

Since there are eight intelligence elements and only five ratings of essentiality, it is evident that some elements will have the same ratings. Also, you may feel that two or more elements should have basically the same degree of essentiality.

However, in the second column of Part 1 labeled "Forced Ranking" it is requested that you give your opinion of the relative importance of each element, entering the applicable number in the blank as appropriate. A "1" signifies the element of greatest importance and an "8" identifies that element as being of least importance. Thus, column one may indicate that two or more elements have equal essentiality ratings, but column two will indicate that one element is just a little more important or essential than the other(s).

In completing both Part 1 and Part 2, fill in all the appropriate blanks. If the number expressing your judgment is not entered in each blank, then your questionnaire cannot be compiled with those of the other respondents.

Your opinion of the relative importance of each element of OB intelligence should be expressed in terms of each of four possible conflict situations. The pertinent conflict situation is defined at the top of each copy of Part 1. Thus, your opinion of the rating and ranking of OB elements on Scenario I, Part 1 will be in terms of a Pre-Hostility situation, on Scenario II, Part 1 the rating and ranking should be expressed in terms of Low-Intensity conflict, and so on. It is

essential that you rate and rank the elements in terms of the particular conflict environment shown, since it is entirely possible that the ratings and rankings are different for the various conflict situations.

Part 2

Part 2 presents, for each of the four scenarios, the components that make up each OB element. Put in the appropriate blanks your opinion of how essential each component is to its element, entering the applicable number in the column labeled "Essentiality Rating." The scale of values to be used should be the same as for Part 1, that is: 1 = Essential, 2 = Important and so on.

After defining the essentiality of each component within a given OB element, put in the corresponding blanks your opinion of their relative importance. Thus, the most important component of an element will be ranked "1", the next most important "2" and so on; with the numbers being entered in the column labeled "Forced Ranking." Since the number of components varies among the elements, the rankings will vary from 1 through 4 in the case of Miscellaneous OB intelligence to 1 through 24 in the case of Disposition intelligence.

As on Part 1, your opinion of the rating and ranking of each intelligence component should be expressed for each of the four possible conflict intensities. Scenario I, Part 2 should be addressed in terms of a Pre-Hostility situation as defined in Scenario I, Scenario II, Part 2 should be addressed in terms of Low-Intensity conflict as defined in Scenario II, etc.

DEFINITION OF OB ELEMENTS

The following brief descriptions of the eight order of battle intelligence elements have been drawn from FM 30-5 "Combat Intelligence" and are presented here for a ready reference.

Composition is the identification and organization of specific units or commands, as opposed to type units. It identifies a unit, indicates what type unit it is, and gives its relative size or strength. It defines the structure of a unit and the relationship of the various echelons within the structure.

Disposition consists of the location of enemy units and facilities and in the manner in which these units are tactically (or administratively in time of peace) deployed. In addition, disposition includes the recent, current, and proposed (or probable) movements of enemy units.

Strength covers the description of a unit or force in terms of the numbers of men, weapons and equipment.

Training describes the nature, type and extent of training of individuals and units; and the organization, facilities, etc. used to

accomplish the training. It includes the thoroughness, degree and quality of specialist, NCO and officer training.

Tactics include tactical doctrine as well as tactics employed by specific units. Tactical doctrine refers to the enemy's accepted principle of organization for, and conduct of, operations. Tactics describe the manner in which the enemy conducts an operation in accordance with tactical doctrine.

Logistics information of interest includes all classes and types of supply, requirements, procurement, distribution, transportation, installations, terminals, evacuation and salvage, and maintenance.

Combat effectiveness is a term used to describe the ability and fighting quality of an enemy unit or entire national army. It predicts how well a unit will perform in combat. It includes morale, health, discipline, political reliability, traditions and past performance of personnel and units; amount and condition of equipment; status of training; efficiency of officer corps; length of time; and conditions under which committed.

Miscellaneous data includes various types of supporting information. These data include intelligence that assists you to "Know your enemy," such as personality files, unit histories, and weapons and equipment characteristics.

Name _____ Date Completed _____

Rank _____ Branch _____

Last Duty Assignment _____.

SCENARIO I

PRE-HOSTILITY SITUATION: A continuing period of non-conflict punctuated with crises or periods of tension (Berlin - 1961, Czechoslovakia - 1968). During this period the basic missions of USAREUR/7A will remain: 1) to deter Soviet aggression or defeat it if it occurs, 2) to maintain the strength and readiness to undertake contingency operations in support of USEUCOM, and special operations related to the status of US forces in Germany, and 3) to provide intelligence, administrative, and logistic support of US Forces. The primary tactical intelligence efforts would be directed toward determining as early as possible any indication of imminence of aggressor hostilities, and developing and maintaining an intelligence data base sufficient to support US/NATO force operations in any conflict which might occur.

Part 1

RATING AND RANKING OF ORDER OF BATTLE ELEMENTS

	Essentiality Rating	Forced Ranking (1 thru 8)
COMPOSITION		
DISPOSITION		
STRENGTH		
TRAINING		
TACTICS		
LOGISTICS		
COMBAT EFFECTIVENESS		
MISCELLANEOUS		

Part 2

RATING AND RANKING OF COMPONENTS OF ORDER OF BATTLE ELEMENTS

COMPOSITION: Number of units by type from highest level down to separate company and detachment.

	Essentiality Rating	Forced Ranking (1 thru 11)
Airborne		
Air Defense		
Armored, Mechanized & Cavalry		
Artillery (tube, rocket & missiles)		
Engineer		
Helicopter Forces		
Infantry		
Combat Support (include CBR, MP, signal & electronic, psywar & intelligence)		
Combat Service Support (include medical, ordnance, QM, transportation)		
Special Purpose (include amphibious, cold weather, and mountain, border & internal)		
Irregular (include guerrilla, partisan & resistance)		

DISPOSITION: Unit designation and field post numbers, mission, subordination and location

	Essentiality Rating	Forced Ranking (1 thru 24)
Airborne Units		
Air Defense Units		
Armored Units (mech & cav)		
Artillery Units (tube, rkt & msl)		
Engineer Units		
Helicopter Forces		
Infantry Units		
Combat Support (CBR, MP, sig, psywar & intelligence)		
Combat Service Support (med., ord., QM & transportation)		
Special Purpose (amph, cold weather & mountain, border & internal security)		
Irregular Forces (guerrilla, partisan and resistance)		
Air Fields		
Air Defense Artillery Sites		
Depots (including ASP & SASP)		
Fortifications		
Headquarters		
Helicopter & VTOL Pads		
Fixed Missile Sites (S to S)		
Mobile Missile Sites (S to S)		
Radar Installations		
Military Installations (located but unidentified)		
POW Installations		
Bases & Staging Areas for Foreign Troops		
Electronic Warfare Installations		

STRENGTH: Numbers of men, weapons and equipment.

	Essentiality Rating	Forced Ranking (1 thru 23)
Personnel Strengths		
Listing of All Officers in All Grades		
Available Manpower		
Reserves		
Mobilization		
Demobilization		
Ethnic & Racial Composition		
Transport Aircraft		
Helicopters		
CBR/nuc Weapons & Munitions		
Electronic Equipment		
Engineer Equipment		
Armored Combat Vehicles		
Artillery Weapons & Ammunition		
Infantry Weapons & Ammunition		
Transportation Vehicles		
Free-flight Rockets		
Over-snow Vehicles		
Amphibious Equipment		
Guided Missiles (surface-to-surface)		
QM Equipment		
Communications Equipment		
Special Purpose Equipment (amph, cold weather, mt, etc.)		

TRAINING: Nature, type and extent of training of individuals and units, and the organization, facilities, etc., which accomplish this.

	Essentiality Rating	Forced Ranking (1 thru 10)
Preinduction		
Combat Units		
Combat Support Units		
Combat Service Support Units		
Special Purpose Units (amph, cold weather, mt, etc.)		
Irregular Units		
Reserve Units		
Military School System		
Maneuvers		
Training Areas		

TACTICS: Doctrinal precepts guiding the ground forces in the conduct of warfare:

	Essentiality Rating	Forced Ranking (1 thru 6)
Conventional Operations		
Nuclear Operations		
Chemical and Biological Operations		
Air Defense		
Paramilitary Operations		
Special Operations (amph, cold weather, mt, etc.)		

LOGISTICS: Methods, plans & systems for procurement, storage, shipment, issue, and maintenance of materiels and supplies and for movement of troops.

	Essentiality Rating	Forced Ranking (1 thru 6)
Supply Methods & Operating Procedures		
Troop & Supply Movements		
Servicing Techniques		
Maintenance (including extreme climatic conditions)		
Evacuation & Dispersal of Materiel and Personnel		
Location, Stockage Levels & Capacity of Stockpiles		

COMBAT EFFECTIVENESS: The ability and fighting quality of units, how well they will perform in combat.

	Essentiality Rating	Forced Ranking (1 thru 11)
Airborne		
Air Defense		
Armored, Mechanized & Cavalry		
Artillery		
Engineer		
Helicpoter Forces		
Infantry		
Combat Support		
Combat Service Support		
Special Purpose (amph, mt, etc.)		
Irregular		

MISCELLANEOUS: Personality files, unit histories, weapons and equipment characteristics.

	Essentiality Rating	Forced Ranking (1 thru 4)
Personalities		
Unit Histories		
Uniforms & Insignia		
Weapons & Equipment Capability		

SCENARIO II

LOW-INTENSITY CONFLICT: A revolt has occurred among certain tribal groups in a friendly nation in the Middle East. The US has begun to assist the endangered government to counteract the threat posed by communist instigation and support of the revolutionaries from neighboring countries. In addition to increased military aid and assistance, the US has implemented a contingency plan and sent US Army combat service support forces and a reinforced airmobile brigade of combat forces in a task force to the country. The mission of the combat brigade is to provide security for the supply and support forces and to engage in limited stability operations against the insurgents. USAREUR/7A supplied the Army forces involved, and continues to provide intelligence, administrative and logistics support to the task force. The primary tactical intelligence mission of USAREUR/7A during this operation is 1) to insure that the task force continues to have adequate intelligence resources and support concerning the insurgent forces and their communist support, and 2) to determine as early as possible any attempt by third country forces to interfere in or escalate the conflict. After several weeks of operation in the country, the logistics and support elements are functioning smoothly and the task force is preparing to launch an operation against an outbreak of insurgency near one of the major forward lines of communication.

Part 1

	Essentiality Rating	Forced Ranking (1 thru 8)
COMPOSITION		
DISPOSITION		
STRENGTH		
TRAINING		
TACTICS		
LOGISTICS		
COMBAT EFFECTIVENESS		
MISCELLANEOUS		

SCENARIO III

MID-INTENSITY CONFLICT: Following a period of rising international tensions Soviet Bloc forces initiated a coordinated non-nuclear attack to seize Western Europe. NATO forces moved smoothly from alert to full wartime status while all NATO nations instituted full mobilization. In the several weeks since D-day, the defense offered by NATO forces has been highly successful in blunting the assault, aided by three significant developments: 1) the prompt, vigorous and unexpected response by France caused hesitation and reevaluation among the Soviet Bloc high command, 2) Soviet Bloc forces, and particularly satellite forces, have encountered problems of equipment, organization and morale which have impaired their effectiveness, and 3) Soviet Bloc efforts to sever NATO lines of communication have failed, and NATO is receiving a continuing flow of replacements and reinforcements. Although launching limited local counterattacks, the NATO forces are still on the defensive and must prepare to meet a renewed Soviet Bloc attack, possibly using nuclear weapons, before the situation stabilizes. The primary tactical intelligence mission is to support CENTAG and SHAPE with intelligence concerning the opposing forces and to determine as early as possible the imminence of enemy employment of nuclear or other unconventional weapons or escalation of the conflict.

Part 1

	Essentiality Rating	Forced Ranking (1 thru 8)
COMPOSITION		
DISPOSITION		
STRENGTH		
TRAINING		
TACTICS		
LOGISTICS		
COMBAT EFFECTIVENESS		
MISCELLANEOUS		

SCENARIO IV

HIGH-INTENSITY CONFLICT SITUATION: Following a period of rising international tensions Soviet Bloc forces initiated a sudden coordinated attack to seize Western Europe. Their efforts to disguise the operation as a response to German provocation convinced France to remain uncommitted and weakened the NATO response. Faced with a smoothly functioning invasion and the imminent threat of employment of unconventional weapons, the SACEUR asked for and received authority to use any means necessary to halt the aggressor. The NATO command switched to a nuclear posture and made effective use of tactical nuclear weapons. In the ensuing exchange the attack was completely halted amid extensive casualties to both sides. In the subsequent few weeks neither side has been able to sustain an offensive effort and the situation has reduced to a conflict of attrition while extensive diplomatic efforts are expended to prevent escalation and achieve a settlement. The tactical intelligence mission is to provide CENTAG and SHAPE with intelligence support concerning the opposing forces in a nuclear exchange environment.

Part 1

	Essentiality Rating	Forced Ranking (1 thru 8)
COMPOSITION		
DISPOSITION		
STRENGTH		
TRAINING		
TACTICS		
LOGISTICS		
COMBAT EFFECTIVENESS		
MISCELLANEOUS		

APPENDIX B

FORCED RANKINGS

As discussed in the main body of the report, each respondent assigned essentiality ratings and order rankings to each OB element and component in each of four levels of hostility. The essentiality ratings were based on a specified scoring system that ranged from "essential" to "of little use." Within each intelligence category being valued, the respondent could assign a given essentiality score to as many or as few items as he desired. However, for each intelligence category being valued, the respondent was also forced to rank each item in the order of its importance.

The primary purpose of forcing each respondent to rank order the intelligence items was to cause him to more carefully consider the values he was assigning. A secondary objective was to obtain another measure of the value of the intelligence items. The primary objective is a fairly standard procedure in this type of data collection and has proven its value in many fields including consumer preferences and psychological and aptitude testing. It is felt that the primary objective was satisfied in this instance and was of significant value. However, in some instances the cross-check technique did not work because the respondents rated the intelligence items in one order but ranked them in a different order, illogically.

The forced ranking system also sometimes permitted correction of errors in the questionnaire. That is, if the respondent forgot to rate an intelligence item, an analyst could often correct this omission if the item was rank ordered. A similar correction could be made if the item were rated but not ranked. Since many of the questionnaires contained omissions, duplications, and other errors, the ability to make corrections based on forced ranking was valuable.

Mean forced rankings can also be used to determine which intelligence item is most valuable. If the magnitudes of the mean essentiality ratings of two (or more) intelligence items are so close that there is no apparent difference in their ratings, and if the magnitudes of their mean rankings are quite different, then the order of the items in rankings indicates the appropriate order of essentiality ratings. This technique can often be used instead of testing the essentiality ratings for statistical significance.

While the forced rankings have been very useful, their role is primarily one of support. Therefore, the forced rankings of the eight OB elements and the components of these elements in four levels of war are presented in here rather than in the body of the report. The figures graphically portray the arithmetic means as derived from the expressions of forced rankings of all respondents. Computer results available at ARI contain the exact values of the forced ranking arithmetic means, as well as statistics such as standard deviation, skew, kurtosis, number of respondents per category, etc., that accompany these forced rankings,

and the forced ranking data for the analyses of unique groups as discussed in the body of the report.

Figure B-1 was previously presented and discussed in the report body as Figure 3 and is reproduced here for convenience.

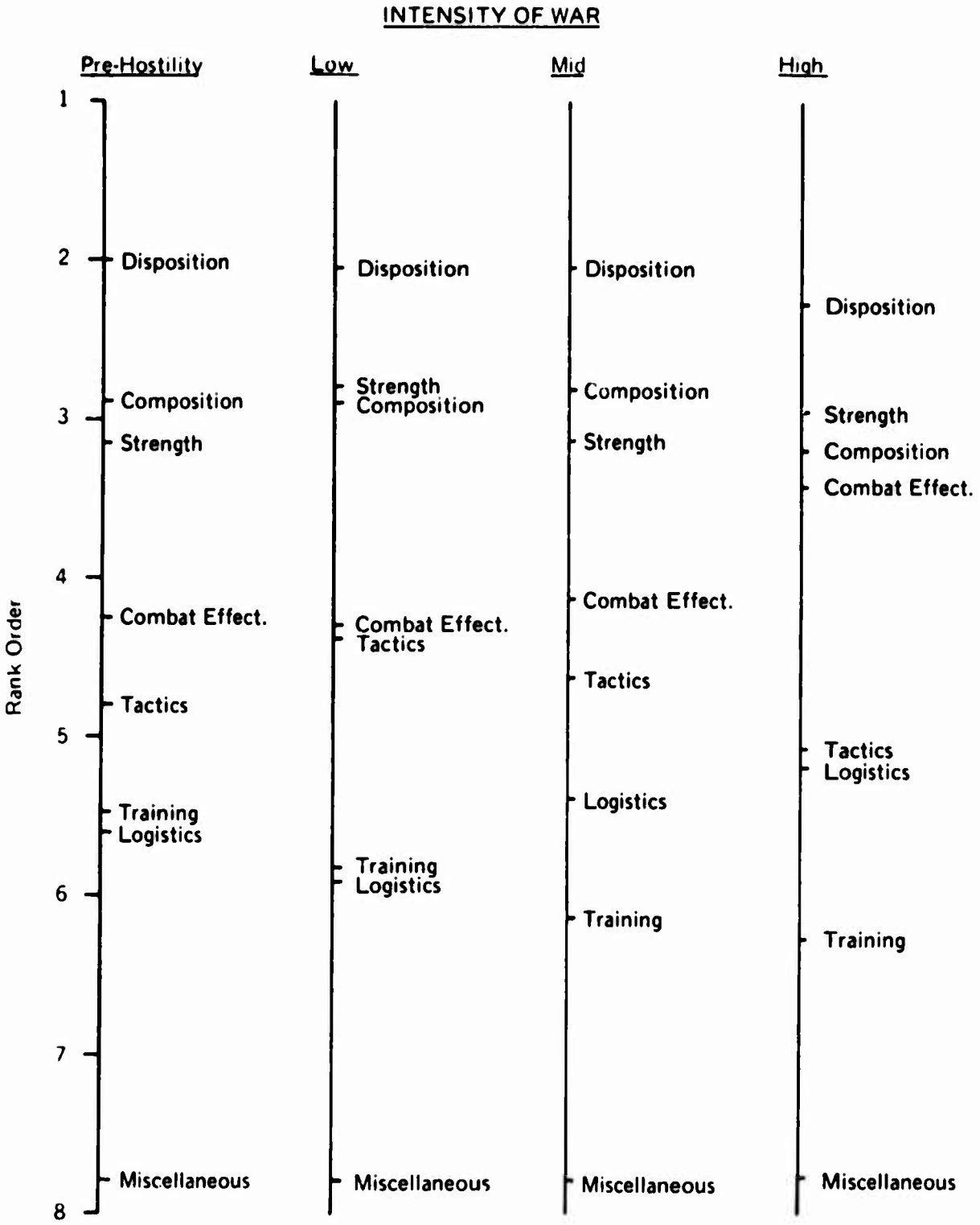


Figure B-1. Forced rankings of 8 OB elements--all respondents.

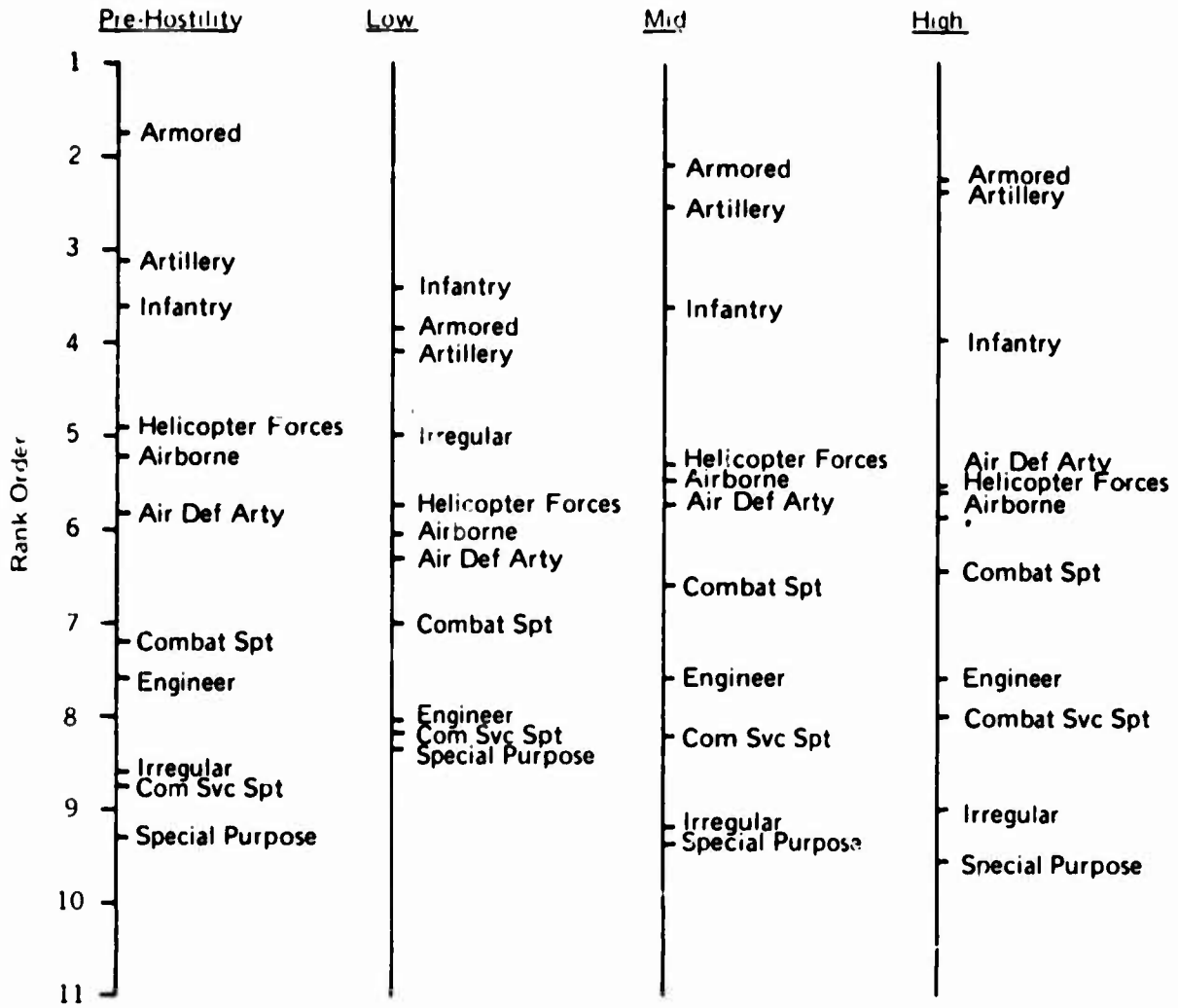


Figure B-2. Forced Rankings of 11 components of Composition intelligence--all respondents.

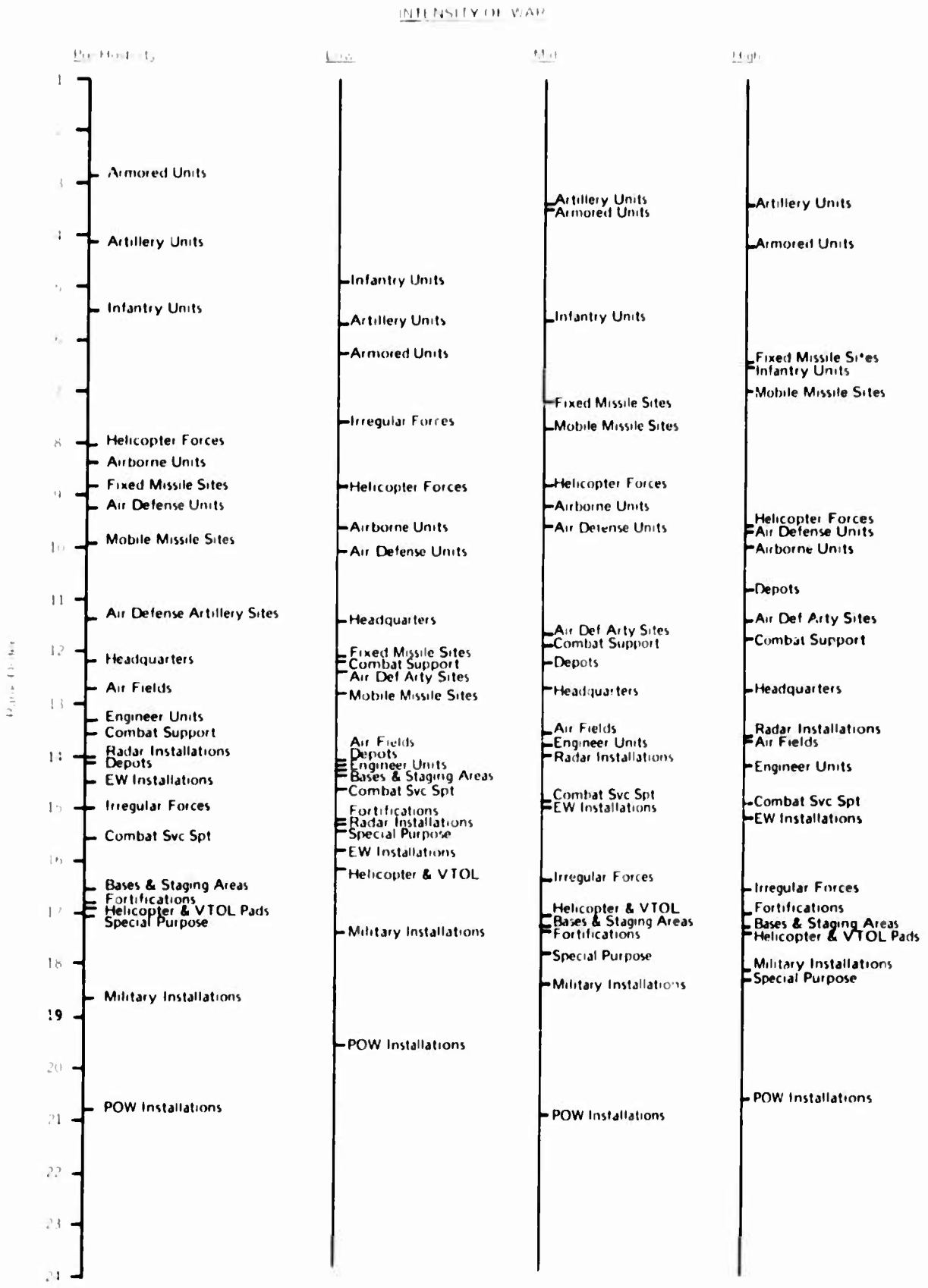


Figure B 3. Forced rankings of 24 components of Disposition intelligence—all respondents.

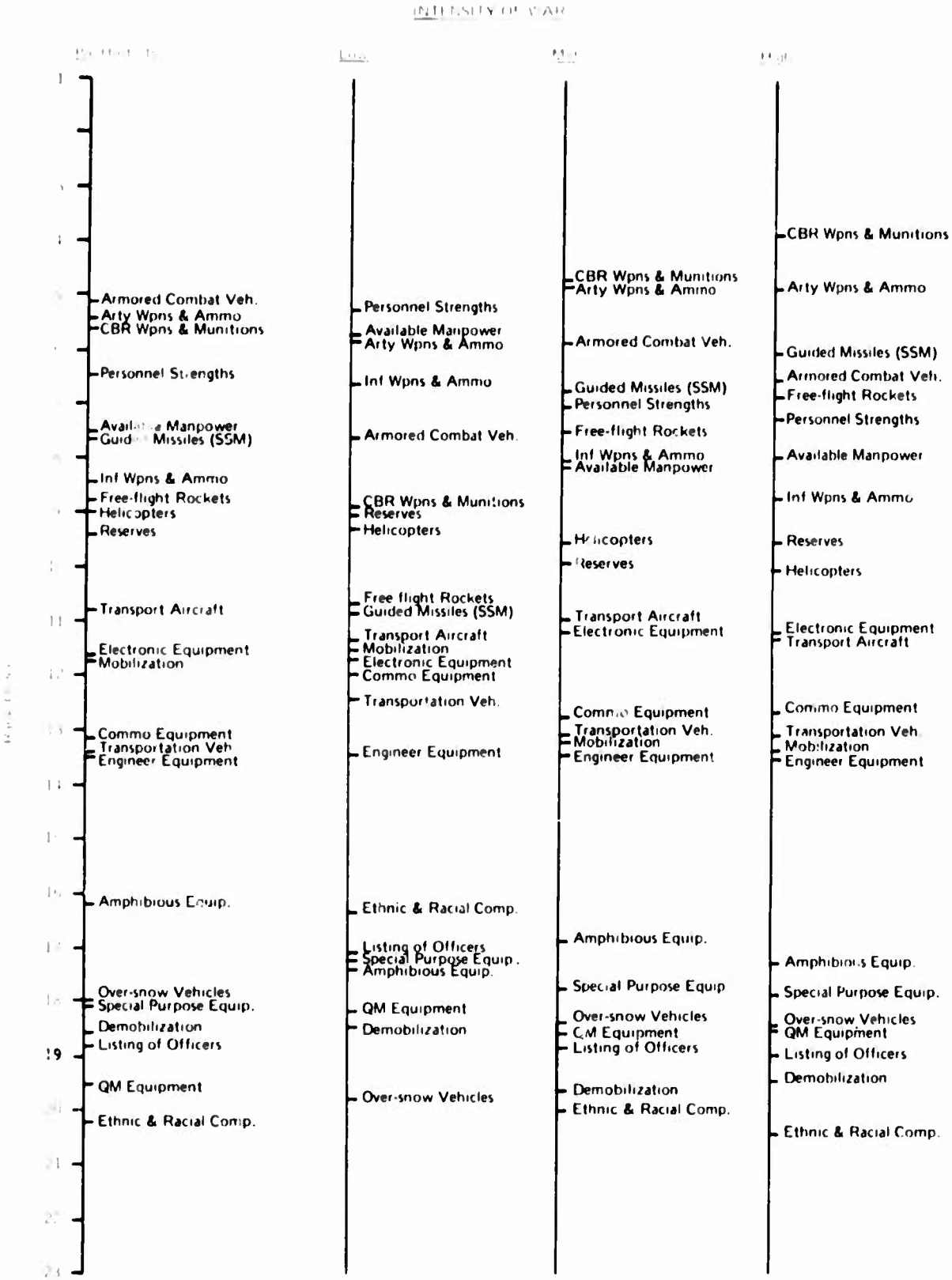


Figure 9.4 Forced rankings of 23 components of Strength intelligence -all respondents.

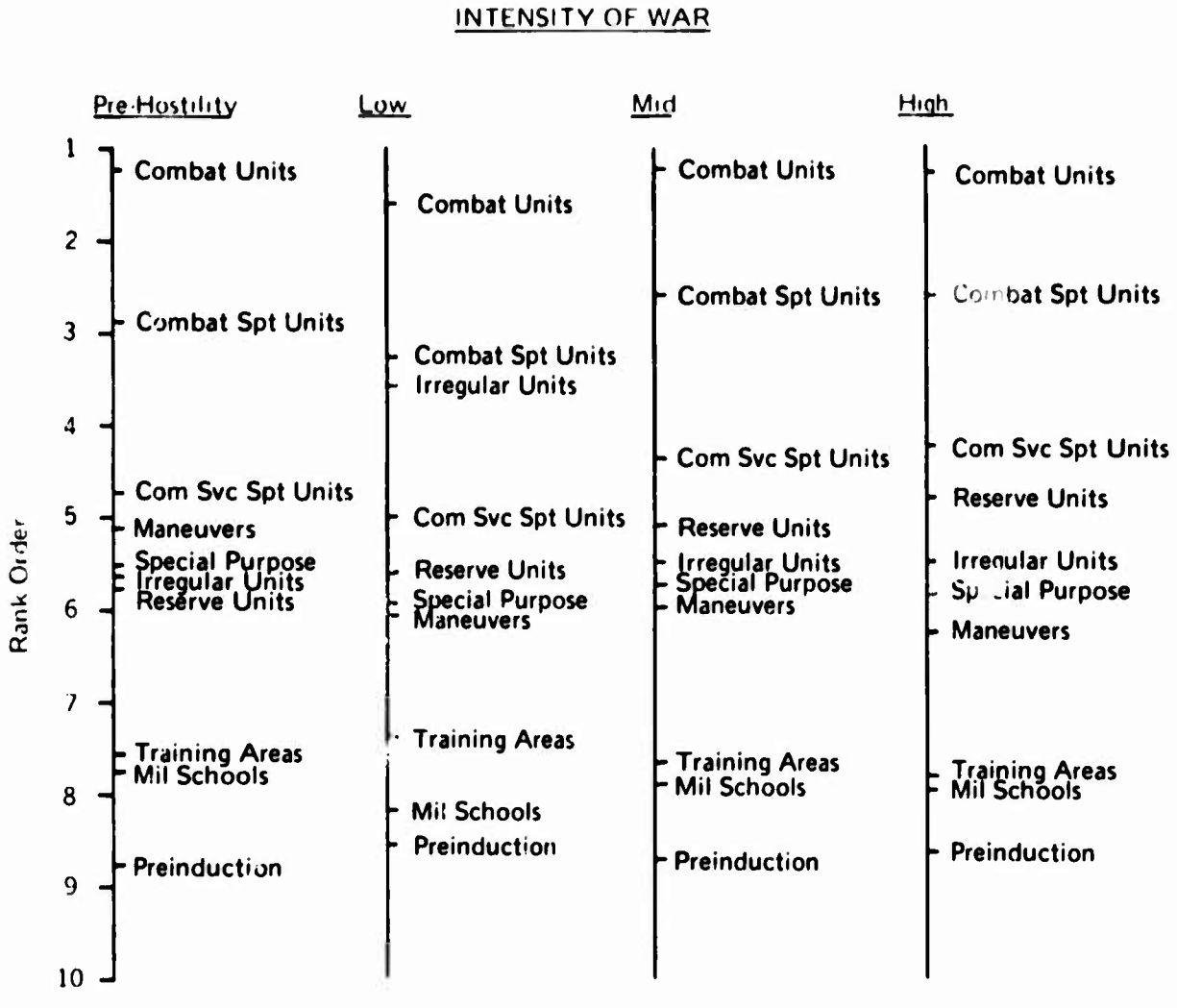


Figure B-5. Forced rankings of 10 components of Training intelligence--all respondents.

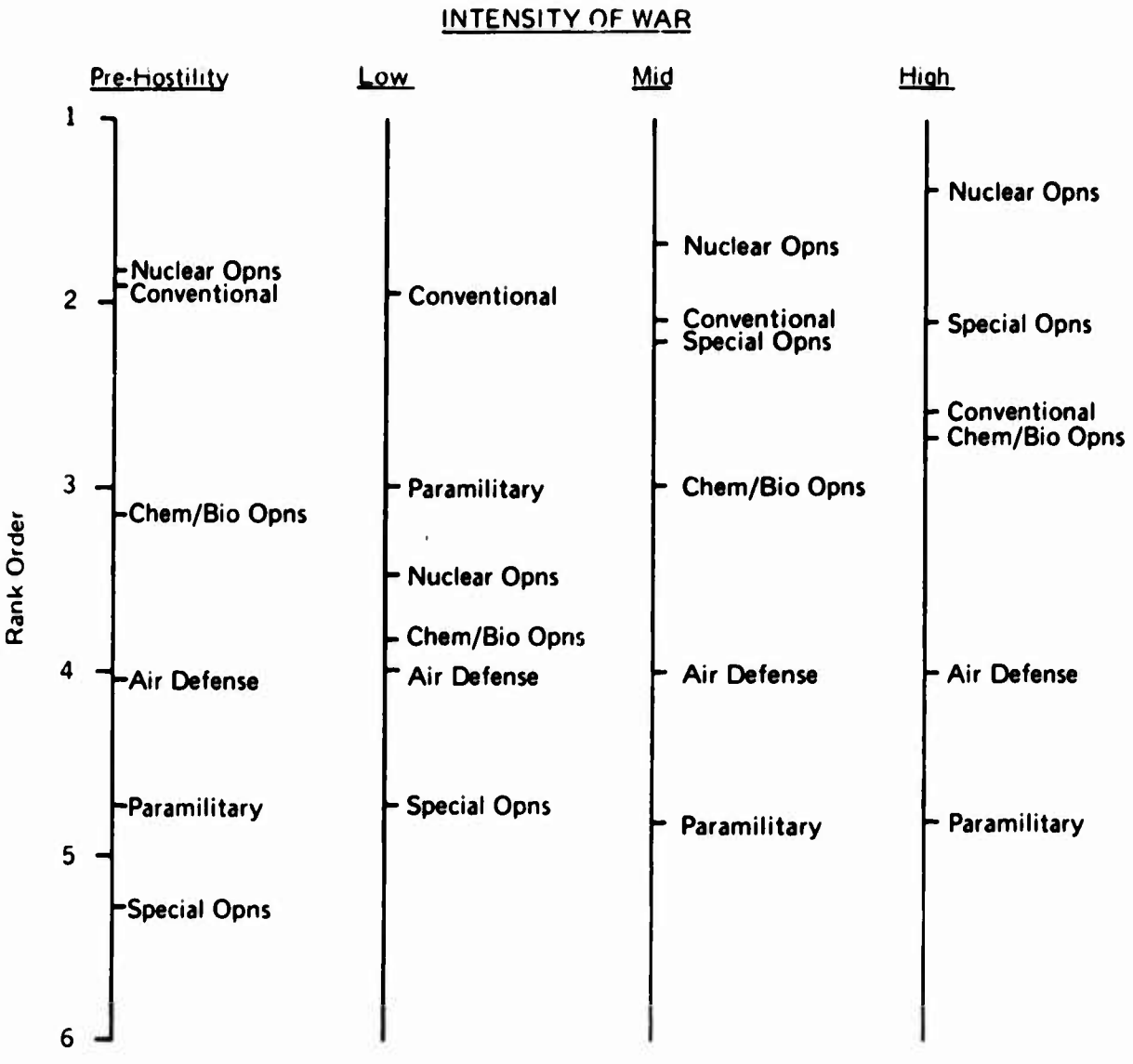


Figure B-6. Forced rankings of 6 components of Tactics intelligence--all respondents.

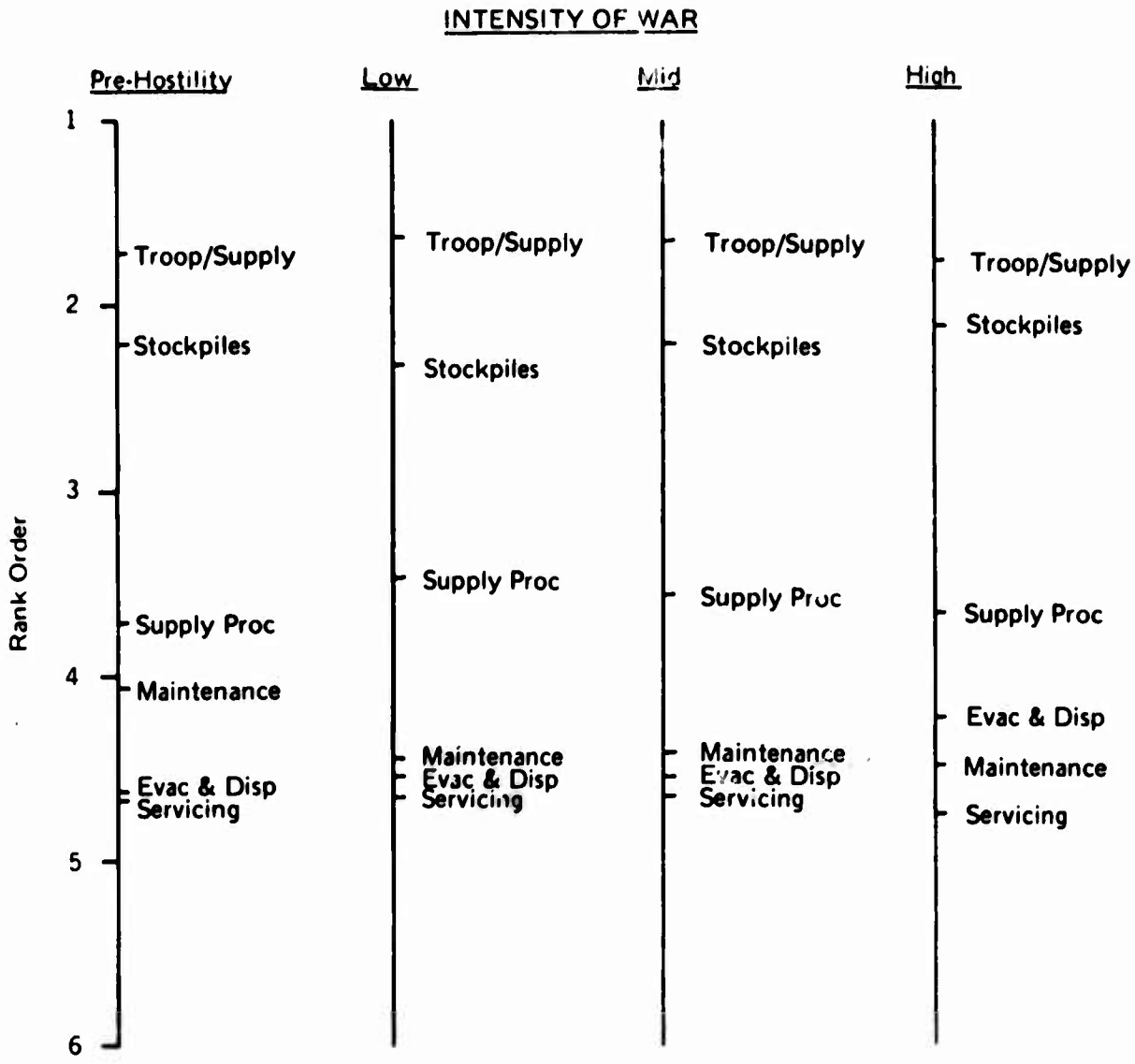


Figure B-7. Forced rankings of 6 components of Logistics intelligence--all respondents.

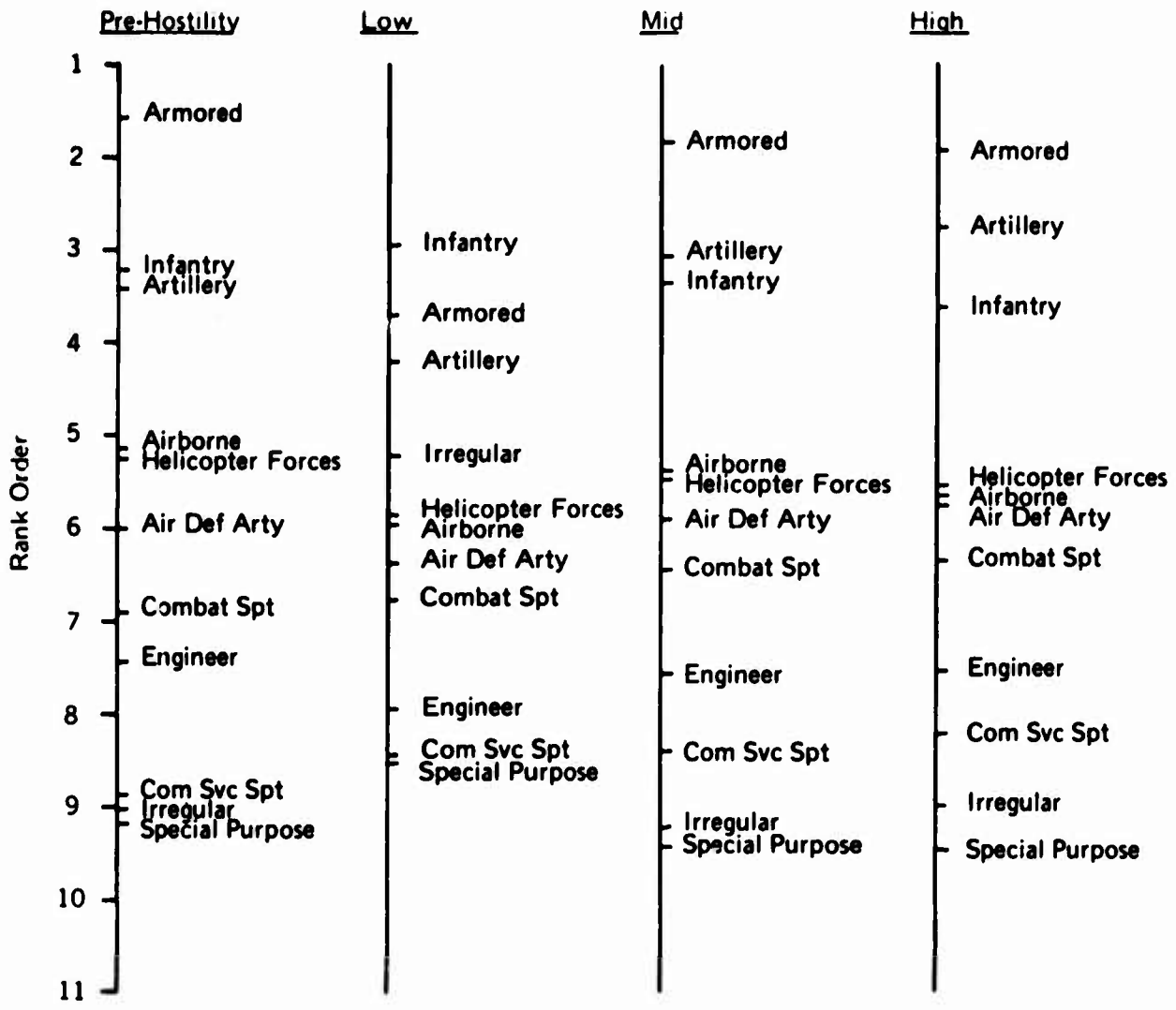


Figure B-8. Forced rankings of 11 components of Combat Effectiveness intelligence-- all respondents.

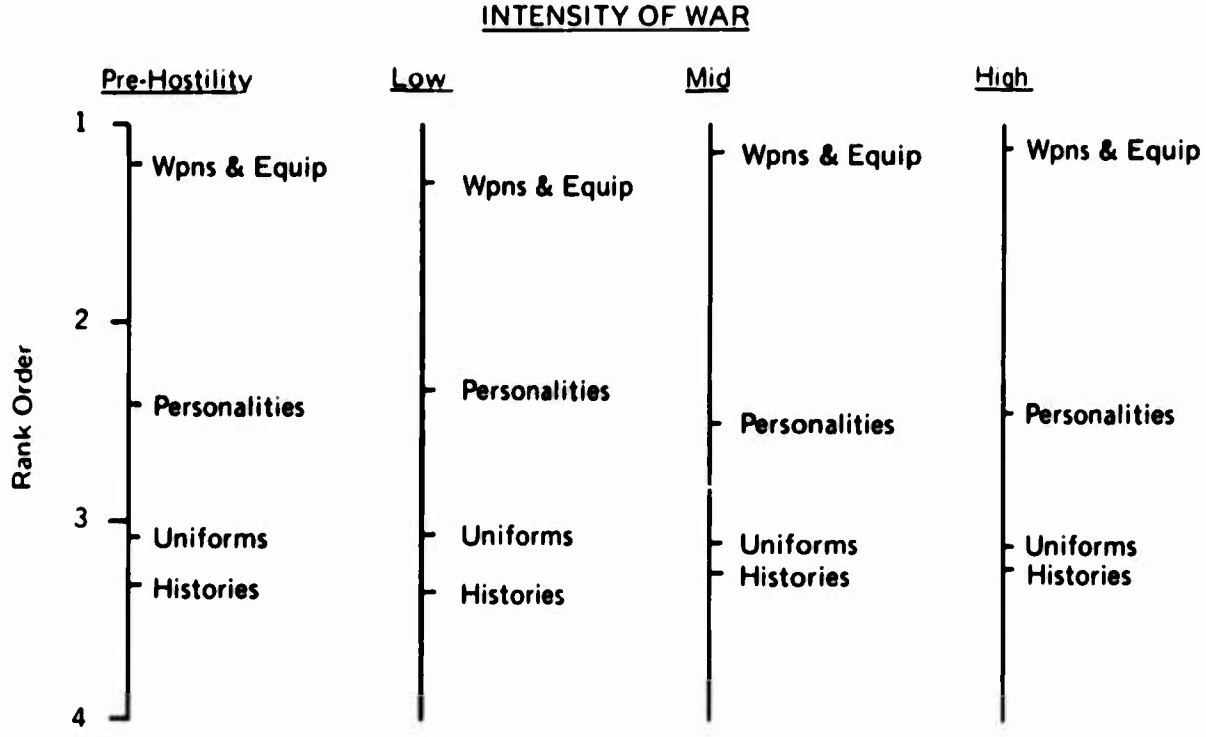


Figure B-9. Forced rankings of 4 components of Miscellaneous intelligence--all respondents.